Catalogue of American Amphibians and Reptiles.

Seidel, M.E. and C.H. Ernst. 2006. *Trachemys scripta*.

Trachemys scripta (Schoepff) Pond Slider

Testudo scripta Schoepff 1792:16. Type-locality, none given; restricted to "Charleston [Berkeley County], South Carolina." by Schmidt (1953:102). Holotype not designated.

Testudo serrata Daudin 1801:148. Type-locality "Carolina". Holotype not designated.

Emys scripta: Schweigger 1812:297.

Emys serrata Schweigger 1812:301. Type-locality unknown. Holotype not designated.

Terrapene serrata: Bonaparte 1830:369.

Emys vittata Gray 1831:28. Type-locality, "America Boreali". Holotype not designated.

Clemmys serrata: Fitzinger 1835:124.

Emys elegans Wied-Neuwied 1839:213. Type-locality not given but later stated as "Fox River bei New Harmony" [Indiana] by Wied (1865:41). Holotype not designated.

Emys troostii Holbrook 1840:55. Type-locality "Cumberland River" [Tennessee]. Holotype, Academy of Natural Sciences of Philadelphia (ANSP) 179, young male (stuffed) collected by Professor Troost, date of collection unknown (not examined by authors).

Emys cumberlandensis Holbrook 1840:55. Type-locality "Tennessee....", specimen(s) collected by Professor Troost. Holotype not designated, no equivalent located at ANSP.

Emys holbrookii Gray 1844:23. Type-locality "N. America. Louisiana". Holotype, The Natural History Museum (BMNH) 1947.3.4.78, juvenile shell, collector unknown (examined by authors).

Emys sanguinolenta Gray 1856:26. Type-locality "North America", erroneously restricted by Schmidt (1953) to Charleston, South Carolina. Holotype, The Natural History Museum (BMNH) 1946.1.22.35 (formerly 51.3.14.1), juvenile in fluid, collector and date of collection unknown (examined by authors).

Trachemys scabra Agassiz 1857:434. *nec* Linnaeus (1766:351), Daudin (1801:249).

Trachemys elegans: Agassiz 1857:435.

Trachemys troostii: Agassiz 1857:435.

Clemmys elegans: Strauch 1862:32.

Clemmys troostii: Strauch 1862:32.

Trachemys holbrookii: Gray 1863:181.

Trachemys scripta: Gray 1863:181. First use of combination.

Emys petrolei Leidy 1868:176. Type-locality, "Hardin County, Texas", Pleistocene fossil placed in synonymy by Weaver and Robertson (1967). Holotype, two epiplastral bones, American Museum of Natural History (AMNH) 3933, collected by George N. Lawrence and D.G. Elliot, date of collection unknown (not examined by authors).

Trachemys lineata Gray 1873:147. Type-locality. North America." Holotype, The Natural History Museum (BMNH) 1946.1.22.78, female in fluid, collector and date of collection unknown (examined by authors).

Pseudemys scabra: Cope 1875:52.

Pseudemys troostii: Cope 1875:53.

Pseudemys elegans: Cope 1875:53.

Pseudemys bisornatus Cope 1878:228. Type-locality "Atascosa County, Texas". Pleistocene fossil placed in synonymy by Weaver and Robertson (1967). Holotype, Academy of Natural Sciences of Philadelphia (ANSP) 9843 and 9844, anterior half of carapace, originally interpreted as syntypes, collected by G.W. Marnock, date of collection unknown (not examined by authors).

Pseudemys (Trachemys) elegans: Jordan 1880:165.

Pseudemys troosti: Yarrow 1882:187.

Chrysemys troostii: Boulenger 1889:76.

Chrysemys scripta: Boulenger 1889:77.

Emys euglypha Leidy 1889:27. Type-locality "Peace Creek beds, Florida." Pleistocene fossil placed in synonymy by Weaver and Robertson (1967). Holotype, nuchal bone collected by W.H. Dall (U.S. Geol. Surv.), specimen cannot be located (Hay 1908).

Chrysemys troosti: Hay 1892:568.

Chrysemys elegans: Hay 1892:569.

Pseudemys scripta: Jordan 1899:209.

Trachemys bisornata: Hay 1902:449.

Chrysemys scabra: Ditmars 1907:39.

Trachemys euglypha: Hay 1908:350.

Trachemys sculpta Hay 1908:351. Type-locality "Hillsboro County, Florida", Pleistocene fossil placed in synonymy by Weaver and Robertson (1967). Holotype, nuchal bone reportedly in the Jarman Collection, Vanderbilt University (not examined by authors).

Trachemys petrolei: Hay 1908:352.

Trachemys trulla Hay 1908:355. Type-locality, "Hardin County, Texas". Pleistocene fossil placed in synonymy by Weaver and Robertson (1967). Holotype, epiplastral bones, American Museum of Natural History (AMNH) 3934. Although not designated, probably collected by George N. Lawrence and D.G. Elliot, date of collection unknown (not examined by authors).

Trachemys delicata Hay 1916:66. Type-locality, "Near Labelle, Lee County, Florida". Pleistocene fossil placed in synonymy by Weaver and Robertson (1967). Holotype, a right fourth costal plate (bone), Florida Geological Survey (FGS 3758), collector and date of collection unknown (not examined by authors).

Chrysemys palustris: Lindholm 1929:294 (in part).

Chrysemys (Trachemys) scripta: McDowell 1964:27.

Pseudemus seripta: Acton et al. 1972:421. *Lapsus.*

Pseudamys scripta: Leslie and Clem 1972:1656. *Lapsus.*

Pseudemys seripta: Ambrosius 1976:300. *Lapsus.*

Pseudemys scriptus: Kim et al. 1984:370. *Lapsus.*

Chrysemys scribta: Ahne 1993:37. *Lapsus.*

• **CONTENT**. Three subspecies, *Trachemys scripta*

scripta, T. s. elegans, and *T. s. troostii* are recognized here. See **Comment**.

• **DEFINITION**. *Trachemys scripta* is a medium-sized emydid, with large females attaining carapace lengths near 300 mm (Platt and Rainwater 2003) and males 230 mm. The head and neck are olive to brown with pale yellow stripes. The mandible is rounded ventrally and the midline of upper jaw tomium forms an obtuse angle, without cusps or notch. The supratemporal (postorbital) is the most prominent marking and varies in shape and pigmentation among subspecies. A prefrontal arrow mark is found on top of the snout and a Y-shaped figure is usually present on the chin. The limbs and tail are similarly pigmented with variable yellow bands and stripes.

The carapace of hatchlings and juveniles is green and has a median keel. The shell of adults is relatively smooth dorsally with lateral longitudinal rugosities. The posterior edges of the carapace are moderately serrate and there is a small median notch. Ground color is olive to brown and a vertical black-bordered yellow bar appears on each pleural scute.The marginals have dark ocellar markings bordered by yellow. Ventral surface (underlap) of the cervical scute is relatively long, geater than 5% of shell length.

The plastron is hingeless and slightly broader anteriorly than posteriorly with a strong bridge fused to the carapace. The color is pale yellow and a dark ocellus or oval smudge appears at least on each gular scute, if not on most of the plastral scutes. The typical formula for midline plastral scute length is abdominal > anal > femoral > < gular > < pectoral > humeral.

Adult males are smaller than females, have elongated curved foreclaws and long, thick tails, with the vent posterior to the carapacial rim. Melanism is common in older males and may result in the complete loss of characteristic markings. Some old females acquire partial melanism.

• **DIAGNOSIS**. *Trachemys scripta* can be distinguished from all other congeners by the following combination of characteristics: extensive underlap of the cervical scute (length of cervical scute ventral surface/carapace length > 0.055); a series of isolated dark spots, smudges, or ocelli on anterior or all plastral scutes; distinct melanism in old males, including development of a nearly black posterior carapace.

• **DESCRIPTIONS**. Some general descriptions are in Agassiz (1857), Alderton (1988), Anderson (1965), Ashton and Ashton (1985), Barbour (1971), Bartlett and Bartlett (1999), Boulenger (1889), Brimley (1907), Bringsoe (2001), Cahn (1937), Caldwell and Collins (1981), Carr (1952), Carr and Goin (1955), Cochran and Goin (1970), Conant (1951), Conant and Collins (1998), Degenhardt et al. (1996), Ditmars (1949), Dundee and Rossman (1989), Ernst (1990), Ernst and Barbour (1972, 1989), Ernst et al. (1994), Freire de Andrade (1994), Guyot Jackson (2003a), Harding (1997), Hurter (1911), Johnson (1982,1987), McKeown (1996), Minton (1971), Mitchell (1994), Mount (1975), Müller (1987), Palmer and Braswell (1995), Pope (1939), Pritchard (1967, 1979), Schmidt and Inger (1957), Smith (1961), and Webb (1970). Other descriptions follow: **plastral scute formula** (Lovich and Ernst 1989), **karyotype** (DeSmet 1978, Killebrew 1977, Stock 1972), **cervical vertebrae** (Williams 1950), **limbs and girdles** (Vannereau et al. 1985, White 1929, Walker 1973), **hyoid** (Haiduk 1979, Schumacher 1973), **epiphysis and pineal gland** (Meissl and Ueck 1980, Quay 1979, Vigh et al.1982, Vigh-Teichmann et al. 1980; Vivien 1967; Vivien-Roels 1969a, 1970), **cerebellum** (Donkelaar and Bangma (1992), **pituitary gland** (Pearson 1985), **olfactory nerve** (Scott 1979), **optic tectum** (Ulinski et al. 1992), **retina** (Peterson 1992), **ear** (Jorgensen 1974, 1988; Miller 1978; Miller and Kasahara 1979; Sneary 1988a,b; Wever 1978), **ovarian granulosa** (Hubert 1985, Rahil and Narbaitz 1973), **penis** (Kelly 2004, Zug 1966), **adrenal gland** (Hebard and Charipper 1955), **thyroid gland** (Thompson 1910, Waterman 1961), **thymus** (Thiruvathukal 1969), **parathyroid gland** (Thompson 1910), **intestines** (Thomas et al. 1994), **pancreas** (Miller and Lagios 1970), **spleen** (Miller and Lagios 1970), and **lungs** (Patterson 1973, Perry 1998, Rothley 1930).

Figure 1. *Trachemys scripta scripta*, adult female (photograph by Roger W. Barbour).

Figure 2. *Trachemys scripta scripta*, hatchling (photograph by Carl H. Ernst).

• **ILLUSTRATIONS**. Numerous illustrations of *Trachemys scripta* are available in the literature; the following is only a partial list. **Color illustrations** of adults are in Alderton (1988), Ashton and Ashton (1985), Barbour (1971), Bartlett and Bartlett (1999),

Figure 3. *Trachemys scripta elegans*, adult male (photograph by Roger W. Barbour).

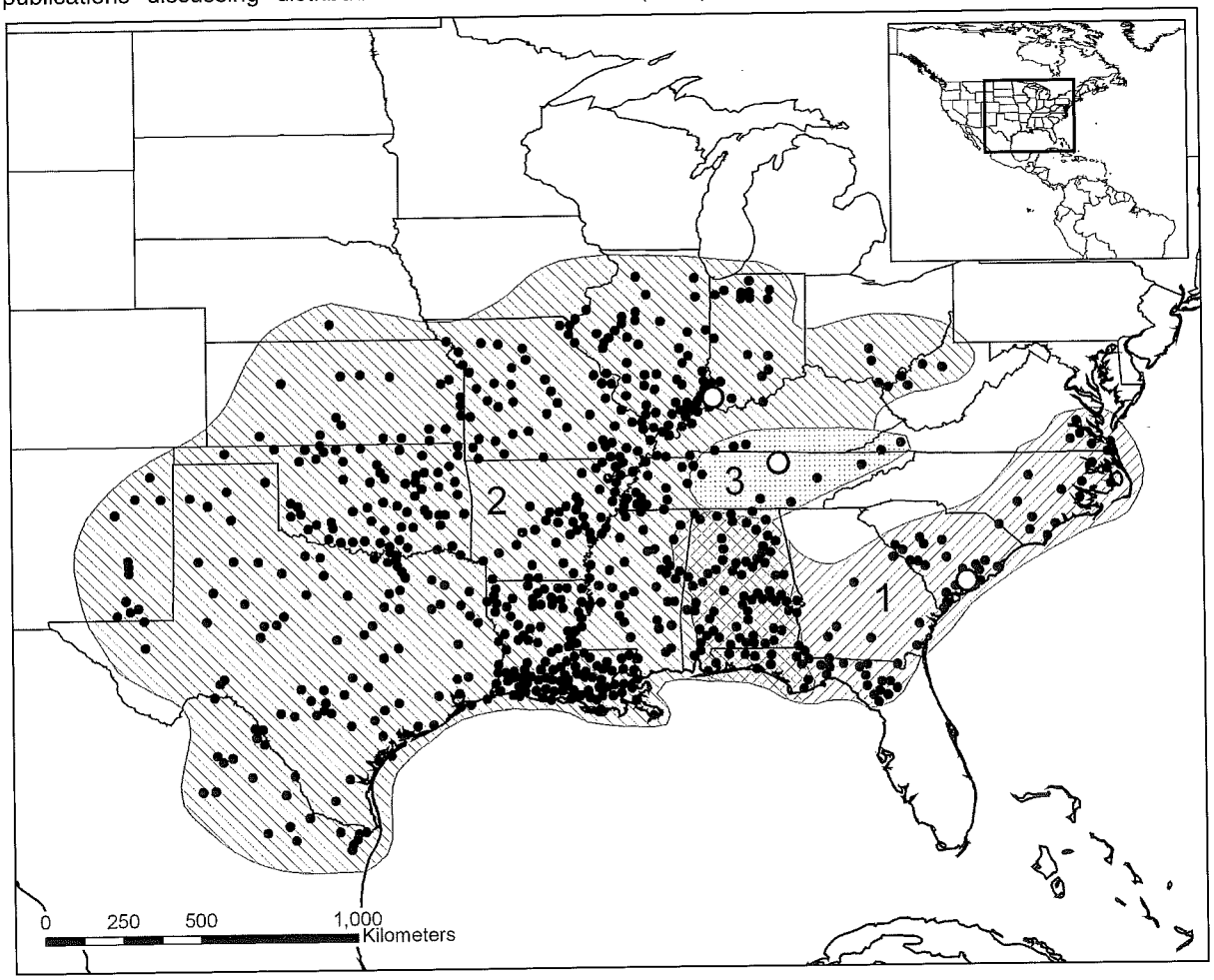
Figure 4. *Trachemys scripta elegans*, adult male (photograph by Carl H. Ernst).

Figure 5. *Trachemys scripta troostii*, adult head (photograph by James H. Harding).

Brames 2005, Caldwell and Collins (1981), Cochran and Goin (1970), Conant and Collins (1998), Degenhardt et al. (1996), Ditmars (1949), Dundee and Rossman (1989), Ernst and Barbour (1972, 1989), Ernst et al. (1994), Ferri (2002), Freire de Andrade (1994), Garrett and Barker (1987), Harding (1997), Jackson (2003a,b), Johnson (1987), Mitchell (1994), Moriarty (2004), Obst (1985), Pritchard (1967, 1979), Schmidt and Inger (1957), Vermersch (1992), Vetter (2004), and Zappalorti (1976). A **color photograph** of a mating pair is in Skovgaard and Wang (2006), and of basking adults in Anonymous (2004). **Black and white illustrations** of adults are in Alderton (1988), Anderson (1965), Bringsøe (2001), Cagle (1950), Cahn (1937), Carr (1952), Carr and Goin (1955), Conant (1951), Ditmars (1936, 1949), Ernst (1990), Ernst and Barbour (1972), Ernst et al. (1994), Legler (1990), Minton (1972), Mount (1975), Müller (1987), Obst (1985), Palmer and Braswell (1995), Pope (1939), Seidel et al. (1999), Smith (1961), and Zappalorti (1976). **Color illustrations** of hatchlings or juveniles can be found in Ashton and Ashton (1985), Cochran (1952), Conant and Collins (1998), Johnson (1987), McKeown (1996), and Pritchard (1979). **Other illustrations** of hatchlings or juveniles are in Agassiz (1957), Bringsøe (1998, 2001), Cagle (1950), Cahn (1937), Carr (1952), Carr and Goin (1955), Ditmars (1949), Ernst et al. (1994), Ewert (1985), Obst (1985), Pritchard (1967), Schmidt and Inger (1957), and Warwick (1991). **The head pattern** is illustrated in (Cagle 1950), Cahn (1937), Carr (1937, 1952), Ernst et al. (1994), Gibbons (1981), Lovich et al. (1990b), Mitchell (1994), and Pope (1939). **Other illustrations** are as follows: **general morphology** (Ashley 1962), **embryological development** (Greenbaum 2002), **embryological anomalies** (Ewert 1979), **bone structure** (Enlow 1969), **shell** (Cagle 1950; Carr 1937; Ernst 1990; Ernst and Barbour 1972; Ernst et al. 1994; Lovich et al. 1990b; Mitchell 1994; Pope 1939; Pritchard 1967, 1979), **nuchal bone** (Adler 1968c, Holman 1995), **shell abnormalities** (Cagle 1950), **shell disease** (Lovich et al. 1996), **skull** (Bringsøe 2001, Ernst 1990, Ernst and Barbour 1972, Gaffney 1979, Maxwell 1979, Romer 1956), **limbs and girdles** (Walker 1973), **forelimbs and claws** (Cagle 1948a, Cahn 1937), **brain** (ten Donkelaar and Bangma 1992, Reiner 1992, Starck 1979), **epiphysis or pineal gland** (Meissl and Ueck 1980, Quay 1979), **adenohypophysis or pituitary gland** (Pearson 1985, Pearson and Licht 1982), **optic tectum** (Ulinski et al. 1992), **trigeminal nerve** (Schumacher 1973), **eye** (Brown 1969, Dacheux 1982, Granda 1979, Granda and Sisson 1992, Lasansky 1971, Ohtsuka 1985, Peterson 1992, Repérant et al. 1992), **ear** (Jorgensen 1974, Wever 1978, **heart and major arteries** (Albrecht 1967, Milsom et al. 1977, White 1976, and White and Ross 1966), **cardiac cycle** (Hicks 1998), **lymphatic sinus and vessels** (Ottaviani and Tazzi 1977), **hemoglobin electrophoregram** (Seidel 2002b), **spleen** (Miller and Lagios 1970), **lungs** (Jackson 1979, Perry 1998), **pancreas** (Miller and Lagios 1970), **female reproductive system** (Gist and Congdon 1998), **gonads** (Crews et al. 1991, Hubert 1985, Moll 1979, Rahil and Narbaitz 1973), **oviductal mucosa** (Gist and Congdon 1998), **ductus deferens** (Lovich et al. 1990), **hermaphroditic genital system** (Hansen 1943), **gametic cycles** (Brewer and Killebrew 1986, Gist et al. 2001), **Sertoli cell and spermatids** (Miranti et al. 1964, Sprando and Russell 1988), **eggs** (Agassiz 1857, Bringsøe 2001; Cagle 1950; Congdon and Gibbons 1990; Ernst et al. 1994; Ewert 1985; Freire de Andrade 1994; Gibbons 1981, 1990b; Janzen et al. 2002; Moll 1979), **courtship behavior** (Cagle 1950, Carpenter and Ferguson 1977, Obst 1985),

oviposition and nest (Cagle 1950, Obst 1985), **adrenal glands** (Gabe 1970), **thyroid gland** (Lynn 1970), **parathyroid gland** (Clark 1965, Thompson 1910), **ultimobranchial body** (Khairallah and Clark 1971, Sehe 1965), **bladder** (LeFevre et al. 1971), **growth pattern** (Dodge and Wunder 1962, Sarnat et al. 1981), **loss of growth annuli** (Cagle 1946), **shell pattern development** (Etchberger et al. 1993, Zangerl 1969), **melanism** (Lovich et al. 1990b, McCoy 1968), **color abnormalities** (Cagle 1947, Griffin and Ernst 1974, Love 1997, Tucker et al. 1995a), **karyotype** (DeSmet 1978, Killebrew 1975) **swimming** (Obst 1985), **walking** (Zug 1971), **basking** (Bury 1979, Hilgenhof 1996, Janzen et al. 2000a, Obst 1985), **protein electrophoregram** (Seidel and Jackson 1990, Vogt and McCoy 1980), **veterinary care** (Gumpenberger and Henninger 2001, Schoemaker and Zandvliet 2005, Straub and Jurina 2001), and **survivorship curve** (Gibbons and Semlitsch 1982).

• **DISTRIBUTION**. Natural populations of *Trachemys scripta* occur throughout the central and southern United States, from Virginia, West Virginia, and Ohio; south through northern Florida; northwest to Iowa and Nebraska, and south to the Pecos River and lower Rio Grande of Texas and Mexico. Some publications discussing distribution in the United States (including extralimital, introduced populations) are Anderson (1965), Anton (1999), Aresco and Jackson (2006), Ashton and Ashton (1985), Ballinger and Lynch (1999), Bancroft et al. (1983), Barbour (1971), Bartlett and Bartlett (1999), Beane and Palmer (2006), Blanchard (1922,1924), Blaney (1971), Brimley (1909), Brown (1950), Buden et al. (2001), Bury and Luckenbach (1976), Bushey 1980, Butterfield et al. 1994, Cagle (1950), Cahn (1937), Caldwell and Collins (1981), Carr (1940, 1952), Carr and Goin (1955), Christiansen and Burken (1978), Clarke et al. (1958), Cochran and Goin (1970), Collins (1993), Conant (1951), Conant and Collins (1998), Cox (1999), D'Alessandro and Ernst (1995), Degenhardt and Christiansen (1974), Degenhardt et al. (1996), Degraff and Rudis (1983, 1987), Devine and Devine (1998), Ditmars (1949), Dixon (1987, 1993), Dixon and Thornton (1996), Dolan et al. (2006), Dundee and Rossman (1989), Easterla (1972), Edgren (1943, 1948), Ehret and Parker (2005), Emer (2004), Ernst and Barbour (1972, 1989), Ernst et al. (1994, 1997), Fidenci (2006), Garrett and Barker (1987), Gaston et al. (2001a,b), Gentry (1956), Gibbons and Harrison (1981), Gordan and Fowler (1961), Green (1969), Green and Pauley (1987), Hall (2003), Haltom (1931), Harding (1997), Hardy (1972), Holman (1994), Holman and Harding (1977), Hulse (1980),



Map. Distribution of *Trachemys scripta*: circles mark type localities and dots indicate other records. Map courtesy of Blake Matejowsky.

Hurter (1911), Hurter and Strecker (1909), Hutchison (1992), Irwin et al. (1994), Iverson (1992a), Iverson and Etchberger (1989), Jackson (2002), Johnson (1987b), Johnston and Johnston (2003), King and Krakauer (1966), Kiviat and MacDonald (2004), Klemens (1985), Knepton (1956), Laerm et al. (1980), Lardie (1981), Lazell (1976), Leiden et al. (1999), Lindeman (2001), Liner (1955), Manchester (1982), Martof (1956), Maxwell et al. (2003), McCoid (1992, 1993), McKeown (1996), Miller et al. (2005), Milstead et al. (1950), Minton (1944, 1971, 1972), Mitchell (1994, 1997), Mount (1975), Neill (1954), Norman (1989), Novonty (1997), Painter and Christman (2000), Palmer and Braswell (1995), Parker (1939), Parmelee (1994), Perry et al. (2005), Phillips et al. (1999), Platt and Snyder (1996), Platt et al. (1999), Raun and Gehlbach (1972), Redmond et al. (1990), Reynolds and Reynolds (1980), Saenz and Collins (1999), Schlauch (1971, 1972), Schmidt (1938), Schmidt and Taggert (2002), Seidel (1975), Serb et al. (1998), Shannon and Smith (1949), Sievert and Sievert (1989), Smith (1956, 1961), Smith and Brodie (1982), Smith and Sanders (1952), Stein et al. (1980), Stitt (2005), Stitt et al. (2004, 2005), Strecker (1915), Stuart (1995a,b, 2000), Taylor (1935), Thornton and Smith (1993), Tinkle (1959), Townsend et al. (2002), Vermersch (1992), Webb (1970), Williamson and Moulis (1994), Williamson et al. (1994), Wilson (1994), Wilson and Porras (1983), and Witzell (1999). **Distributional maps** for the United States are in Anderson (1965), Ashton and Ashton (1985), Barbour (1971), Bartlett and Bartlett (1999), Cagle (1950), Cahn (1937), Caldwell and Collins (1981), Carr (1952), Collins (1993), Conant (1951), Conant and Collins (1998), Degenhardt and Christiansen (1974), Degenhardt et al. (1996), Dixon (2000), Dundee and Rossman (1989), Ernst (1990), Ernst and Barbour (1972), Ernst et al. (1994), Garrett and Barker (1987), Gibbons (1990a), Green (1969), Green and Pauley (1987), Harding (1997), Holman (1994), Iverson (1992a), Iverson and Etchberger (1989), Johnson (1987b), Lindeman (2001), McKeown (1996), Minton (1972), Mitchell (1994), Moriarty (2004), Mount (1975), Palmer and Braswell (1995), Smith (1961), Smith and Brodie (1982), Smith and Scribner (1990), Tobey (1985), Vermersch (1992), and Webb (1970).

Trachemys scripta has been introduced widely throughout the globe through the pet and meat trade. A sample of some of the papers discussing **foreign distribution** follows: Agosta and Parolini (2000), Alvarez and Esteban (2002), Ayres and Cordero (2002), Bouskila (1986), Bowey and Durkin (1996), Branch (1988), Bringsøe (1996, 1998, 2001), Buden (2000), Cadi and Bertrand (2003), Cady and Joly (2004), Cadi et al. (2004), Capalleras and Carretero (2000), Chen and Lue (1998), Crother (1999), Da Silva and Blasco (1995), Dahmer et al. (2001), Daniels (1994), Davenport et al. (2005), De Roa and Roig (1997), Dimitropoulos (1989), Dudgeon (1996), Dupre (1995), Ensabella et al. (2003), Ferri and DiCerbo (1996a,b, 1997), Ferri et al. (1999a,b), Filella et al. (1999), Freire de Andrade (1994), Fritz (2001), Fritz and Gaulke (1997), Giugliano (1988), Guntermann (1999), Iriarte et al. (2005), Jooris et al. (1998), Kordges (1990), Lageweg and Ijlst (1993), Levasseur and Faucheux (2003), Lever (2003), Luiselli et al. (1997), Malkmus (2006), Manzke (1993), Martinez-Silvestre et al. (1997), McCoid (1992), Meier (2000), Morikawa et al. (2005), Müller (1994), Newberry (1984), Nilson and Anderson (1986), Ng et al. 1993, Obst (1985), Pallewatta et al. 2003, Phillippen (1982), Platt and Fontenot (1992), Pointet (2003), Poon et al. 2005, Praschag (2002), de Roa and Roig (1998), Rodda et al. (1991), Roig and de Roa (1998), Rowe (1993), Sandlund et al. (2001), Sasaki et al. (2005), Schmidt and Owens (1994), Schwartz and Henderson (1991), Servan and Aury (1997), Severinghaus and Chi 1999, Silva and Blasco (1995), Silvestre and Cerradelo (2000), Smith and Smith (1975), Spellerberg 1976, Steinbock (1997), Stimson (1995), Thomas and Hartnell (2000), Tome (1996), Valentin (2000), Williams et al. (1960), and Xinmin (2005). **Maps of foreign distributions** are in Bringsøe (2001), Freire de Andrade (1994), LaVasseur and Faucheux (2003), and Obst (1985).

• **FOSSIL RECORD**. Many fossils of *Trachemys scripta* have been found, and have been summarized by Gehlbach (1965), Jackson (1988b), and Holman (1995). A questionable reference to Miocene fragments appears in Lambert (1994); another questionable record of Pleistocene fossils from California appears in Remeika et al. (1995). The earliest fossils which are directly ancestral to the species (Seidel and Jackson 1990) are from Pliocene (Blancan) deposits in **Idaho** (Gilmore 1933, Jackson 1988b, Rose and Weaver 1966, Zug 1969), **Indiana** (Farlow et al. 2001), **Nebraska** (Holman and Schloeder 1991), **Tennessee** (Parmley et al. 2002), and **Texas** (Rogers 1976). Early Pleistocene (Irvingtonian) records are from **Florida** (Hulbert and Morgan 1989; Meylan 1982), **Kansas** (Galbreath 1948; Holman 1971, 1984, 1986, 1987; Preston 1971, 1979; Preston and McCoy 1971; Rogers 1982; Schultz 1965), **Oklahoma** (Galbreath 1948, Preston 1979, Smith and Cifelli 2000), and **Texas** (Parmley 1988; Preston 1966, 1979). Late Pleistocene (Rancholabrean) fossil material has been found at several sites in **Florida** (Frazier and Franz 1978; Gut and Ray 1963; Holman 1962, 1978; Jackson 1977, 1988b; Meylan 1995; Weaver and Ober 1971; Weaver and Robertson 1967; Weigel 1962; Young and Laerm 1993), **Illinois** (Holman 1966), **Kansas** (Holman 1971, 1972; Preston 1979), **Mississippi** (Daly 1992), **Missouri** (Hawksley 1986, Moodie and Van Devender 1977, Preston 1979), **Nebraska** (Ford 1993), **South Carolina** (Bentley and Knight 1998), **Tennessee** (Guilday et al. 1969), and **Texas** (Hay 1924; Holman 1963, 1964, 1965, 1969; Johnson 1986; Lundelius 1972; Preston 1979).

Preston (1979) and Weaver and Robertson (1967) suggested that Rancholabrean *T. scripta* be assigned to the extinct subspecies *T. s. petrolei* (Leidy 1868), but Jackson (1988b) presented evidence that all Pleistocene fossil *Trachemys*, including the extinct taxa *T. s. bisornata* (Cope 1878) from the Irvingtonian

of Texas and *T. s. petrolei* (Leidy 1868) from the Rancholabrean of Texas, should be assigned to the species *T. scripta* without subspecific designation. We follow Jackson's suggestion.

In addition to fossils, **archeological records** of *T. scripta* exist for **Arkansas** (Kelley 1990), **Florida** (Percy 1974; Reitz 1992), **Illinois, Michigan and Wisconsin** (Adler 1968a, Fowler 1959, Parmalee et al. 1972), **Missouri** (Johnson 1975; Parmalee 1962, 1965, 1966; Parmalee et al. 1976), **Ohio** (Church 2001), **Oklahoma** (Duncan 2002), **West Virginia** (Adler 1968b), and **Texas** (Creel et al. 1990; Doehner et al. 1978; Duffield 1970; Few 2002; Gallagher and Bearden 1976; Hellier et al. 1995; Hester 1975; Hudgins 1986; Johnson 1984, 1987a; Lord 1981, Martin 1994; McKusick 1981).

• **PERTINENT LITERATURE**. *Trachemys scripta* is one of the most studied of all turtles, consequently its literature is extensive. Following are selected references, but the list is by no means a complete bibliography of the species. **General accounts** are in Anderson (1965), Ashton and Ashton (1985), Barbour (1971), Bartlett and Bartlett (1999), Behler and King (1979), Blair et al. (1957), Bonin et al. 1996, Brimley (1942-1943), Bringsøe (2001), Cahn (1937), Caldwell and Collins (1981), Carr (1940, 1952), Christiansen and Bailey (1988), Cochran (1952), Cochran and Goin (1970), Collins (1993), Conant (1951), Conant and Collins (1998), Degenhardt et al. (1996), Ditmars (1936), Dundee and Rossman (1989), Ernst and Barbour (1972, 1989), Ernst et al. (1994, 1997), Freire de Andrade (1994), Frolich (1995), Garrett and Barker (1987), Gibbons (1981), Green and Pauley (1987), Guyot Jackson (2003b), Hennig (2002, 2003), Holbrook (1976), Holman (1996), Jahn (1985), Johnson (1987b), Lehrer (1990), Martof et al. (1980), McKeown (1996), Minton (1972), Mitchell (1984), Mount (1975), Müller (1987), Myers (1925), Nollert (1992), Obst (1980, 1985, 1988), Oliver (1955), Palmer and Braswell (1995), Patterson (1994, 1995), Phillippen and Rogner (1985), Pope (1939, 1964), Rauh (2000), Rogner (1995), Rose and Manning (1996), Schmidt and Inger (1957), Smith (1961), Smith and Smith (1979 [1980]), Stebbins (2003), Trauth et al. (2004), Ullrich (1998), Vermersch (1992), Wilke (1997, 1998), and Zappalorti (1976). Other selected references are arranged by topic as follows: **phylogenetics and evolution** (Albrecht 1967; Avise 1989; Avise et al. 1987, 1992; Bickham et al. 1988; Blakey and Kirkwood 1995; Bromham et al. 2002; Carroll and Opdyke 1982; Caspers et al. 1996; Cervelli et al. 2002, 2003; Claude et al. 2003; Cocquet et al. 2003; Cohen 1955; Conlon 2000; Davidson and Freeman 1976; Dessauer et al. 1962; Fitzsimmons et al. 1995; Forstner et al. 1995; Frair 1964; Gorinsek et al. 2004; Hedges 1994; Hedges and Poling 1999; Herrel and O'Reilly 2006; Herrel et al. 2002; Honda et al. 2002; Hughes and Mouchiroud 1999; Hughes et al. 1999; Humphries et al. 1987; Iwata et al. 2002; Janzen et al. 2000a,b; Joyce et al. 2004; King and Julian 2004; Kordis and Gubensek 1998; Krenz et al. 2005; Kumazawa and Nishida 1995; Lamb et al. 1991; Lovsin et al. 2001; Mannen and Li 1999; Mannen et al. 1997; Meyers et al. 2006; Moen 2006; Near et al. 1998, 2005; Neff and Gross 2000; Poschadel and Möller 2004; Rieppel 2000; Roman and Bowen 2000; Scribner and Chesser 2001; Scribner et al. 1984, 1986; Shaffer et al. 1997; Shugart and Theodorakis 1998; Sites et al. 1984; Smith and Scribner 1990; Spotila et al. 1998; Stephens and Wiens 2003; Takada and Koopman 2003; Tracy and Hedges 2000; Van Tuinen 2000; Walker and Avise 1998; Waters et al. 1976; Weaver and Robertson 1967; Wistow et al. 1988; and Xia et al. 2003); **karyotype** (Bickham and Baker 1976, 1979; Bickham and Carr 1983; De Smet 1978; Forbes 1967; Gilboa 1974; Killebrew 1977; Muhlmann-Diaz et al. 2001; Stock 1972; Ulsh et al. 2000); **systematics and taxonomy** (Bickham et al. 1996; Boulenger 1889; Bour 2003a,b; Brooks 1981; Cahn 1937; Carr 1937, 1952; David 1994; Ernst 1990; Ernst and Ernst 1980; Frair 1964; Guibé 1970; Hartweg 1939; Holman 1977; Jamniczky 2006; McDowell 1964; Pope 1955; Schmidt 1953; Scribner et al. 1984, 1986; Seidel 2002a,b; Seidel and Jackson 1990; Seidel and Smith 1986; Seidel et al. 1999; Shaffer et al. 1997; Sites et al. 1984; Smith and James 1958; Stephens and Wiens 2003; Vogt and McCoy 1980; Ward 1980, 1984; Weaver and Rose 1967; Wermuth and Mertens 1961, 1977; Williams 1956; Zug 1966, 1971); **intergradation and hybridization** (Cagle 1950; Davidson 1971; Davidson and Mount 1972; Ernst and Jett 1969; Ernst et al. 1997; Fritz 1995; Legler 1963; Mitchell 1994; Seidel et al. 1999; Stuart and Ernst 2004; Tuberville et al. 2005).

Morphology and Functon: general (Ashley 1962; Eiland 2002); **skeletal** (Enlow 1969; Iverson 1984; Kashiwa 1970; Matthews 1970; Rhodin 1985; Romer 1956; Suzuki 1963); **shell** (Andrews 2000; Burke 1989; Gilbert et al. 2001; Meyers et al. 2006; Tinkle 1962; Zangerl 1969); **cervical vertebrae** (Shufeldt 1921; Williams 1950); **skull** (Druzinsky and Greaves 1979; Frazzetta 1968; Gaffney 1979); **limbs** (McCoy and Jacobs 1991; Walker 1973; Zug 1971); **shoulder girdle** (Depecker et al. 2006); **skin** (Alexander 1970, Baden et al. 1974; Fukuyama and Epstein 1968; Stone and Iverson 1999); **nose** (Hatanaka and Hanada 1986; Parsons 1959, 1960, 1968; Scott 1979); **olfactory nerve** (Franceschini et al. 1996; Hatanaka and Hanada 1987; Jahr and Nicoll 1982; Kaliszewski 1993; Scott 1979; Switzer and Johnson 1977); **ear** (Ariel et al. 2004; Bellin 2000; Brichta and Peterson 1994; Brichta et al. 1988; Browner 1983; Browner and Marbey 1988; Browner et al. 1981; Carr and Code 1985; Cochran and Correia 1995; Fontilla and Peterson 2000; Hailey et al. 1991; Huwe 1999; Jorgensen 1974; Marbey and Browner 1984; O'Neill 1993; Rowe and Peterson 2006; Severinsen et al. 2003; Wever 1978); **eye** (Adolph 1988; Akopian et al. 1991, 1992; Ammermüller et al. 1993, 1998; Anderton and Miller 1989; Ariel 1989; Ariel and Adolph 1985; Baylor 1976; Baylor and Fettiplace 1976, 1977a,b, 1979; Baylor and Hodgkin 1973; Bertrand et al. 1978; Blute et al. 1999; 2000; Brown 1969; Burkhardt 1994; Burkhardt et al. 1988, 1989a,b; Bush 1971; Bush and Lunger 1972; Byzov and Cervetto 1977; Cao 2003;

Carras 1983; Cervetto 1973; Cervetto and MacNichols 1972; Cervetto and Piccolino 1974; Cervetto et al. 1976; Chikuda 1982; Cooper et al. 1990; Creaven 1998; Criswell and Brandon 1987, 1992; Critz and Marc 1987; Cuenca and Kolb 1989; Cuenca et al. 2000; Dacheux 1982; Dain et al. 1994; Dearworth 1999; Detwiler et al. 1978; Djamgoz and Kolb 1993; Dunser et al. 1981; Dvorak and Granda 1990; Ehinger et al. 1988; Eldred and Cheung 1989; Eldred and Hurd 1987; Eldred and Karten 1983, 1985; Eldred et al. 1988, 1992; Fernandez and Kolb 1993; Fernandez et al. 1994; Fuertes and Simon 1976; Gardiner and Dacey 1988; Gaur et al. 1988, 1989; Geri 1981; Gerschenfeld 1978; Gerschenfeld and Piccolina 1977, 1980; Giannaccini et al. 1989; Golard and Witkovsky 1989; Golard et al. 1992; Granda 1970; Granda and Fulbrook 1989; Granda and Haden 1970; Granda and Sisson 1992; Greschner et al. 2002; Guiloff 1987, 1992; Guiloff and Kolb 1992, 1994; Guiloff et al. 1988, 1989; Haverkamp and Eldred 1998; Haverkamp et al. 1999; Hodgkin and O'Bryan 1977; Hurd and Eldred 1989, 1993; Isayama et al. 2004; Jensen and Devoe 1982, 1983; Johnson 1927; Kittila and Granda 1994; Kogo et al. 2002; Kolb 1982; Kolb and Jones 1982, 1985, 1987; Kolb et al. 1986, 1987, 1997; Kouyama and Ohtsuka 1985; Lam 1972; Lamb 1976; Lamb and Simon 1976a,b, 1977; Lasansky 1969, 1971; Lasater and Witkovsky 1988; Le Dain et al. 1994; Lee et al. 2005; Leeper 1978a,b, 1982; Liebman and Granda 1971, 1975; Lipetz 1975; Lipetz and MacNichol 1983; Loew and Govardovskii 2001; Marchiafava 1976; Marchiafava and Torre 1977, 1978; Marchiafava and Wagner 1981; Marchiafava and Weiler 1980, 1982; Martin et al. 1998, 2003; Matsura et al. 1978; McBurney and Schnapf 1980; Micali et al. 1999; Millar and Anderton 1991; Miller et al. 1973; Muntz and Sokol 1967; Musser and Rosen 1972, 1973; Naka et a. 2004; Neyton et al. 1981; Normann and Perlman 1979a,b; Normann et al. 1984; Northmore and Granda 1991a,b; Ohtsuka 1985; Ohtsuka and Kouyama 1985; Perlman et al. 1993; Peterson 1992; Piccolino 1976; Piccolino and Gerschenfeld 1978, 1980; Piccolino et al.1987, 1996, 1999; Pluvinage 1985; Pollard and Eldred 1990; Pottek et al. 2003; Prechtl 1994; Precht and Bullock 1992; Puzzolo et al. 1991; Rabl et al. 2002; Rajendran et al. 1989; Raviola and Gilula 1973a,b; Raybourn 1983; Reiner 1981; Reiner et al. 1996; Richter and Simon 1974, 1975; Saito et al. 1974; Sarthy and Bunt 1982; Sarthy and Lam 1978, 1979; Schaeffer and Raviola 1975, 1976, 1978; Schütte and Schlemermeyer 1993; Schütte and Weiler 1987, 1988; Schneeweis and Green 1995; Schnyder and Künzle 1983; Schwartz 1978, 1981; Senseman 1999; Siminoff and Ohtsuka 1985; Simon 1974; Simon et al. 1975; Sjostroum and Ulinski 1985; Thoreson et al. 1987; Tranchina and Peskin 1986; Tranchina et al. 1980, 1981, 1983; Twig et al. 2002; Ulinski 1980; Ulinski and Nautigal 1988; van Veen et al. 1986; Ventura et al. 2001; Walbarsht 1976; Walls 1942; Weiger and Lametschwandtner 1989; Weiler 1985; Weiler and Akopian 1989; Weiler and Ball 1986; Weiler and Schütte 1985; Wheeler and Naka 1977; Williams et al. 1982; Witkovsky et al. 1984, 1987; Woodbury and Ulinski 1986; Wulle and Wagner 1990; Yaqub 1993; Yazulla 1976a,b, 1977; Yazulla and Schmidt 1976; Zhang and Eldred 1994; Zucker and Adolph 1987); **orbital glands** (Baccari et al. 1992, 1993, 1996); **optic system** (Martin and Ariel 2005; Schuerger et al. 1990; Ulinski et al. 1992; Weber et al. 2003); **brain and nerves** (Berkowitz 2004; Clinton 2005; Heller and Ulinski 1987; Platel 1979; Quay 1972; Reiner and Carraway 1985; Schmolke and Künzle 1997; Tuge 1932; Vigh et al. 1970; Vigh-Teichmann et al. 1970; Vivien 1964; Vivien-Roels 1970a,b; Vivien and Roels 1968; Walsh et al. 1972; Zhu and Keifer 2005); **spinal cord** (Berkowitz 2002; Delgado-Lezama et al. 1997, 1999; Hounsgaard and Kjaerulff 1992; Keifer and Stein 1983; Kuzuma et al. 1979; Perrier et al. 2000; Ruigrok et al. 1985c; Russo et al. 1998; Santini 1990; Schroeder 1986; Skydsgaard and Hounsgaard 1996); **pineal gland** (Dodt and Meissl 1982, Kleiter and Lametschwandtner 1995a, Vivien-Roels 1969); **pituitary gland** (Panzica 1979; Pearson 1985; Pearson and Licht 1982); **thyroid gland** (Clark 1968, Hugenberger and Licht 1999, Lynn 1970, Roe et al. 1989; Thompson 1910); **parathyroid gland** (Clark 1965, 1970; Grandi 1982a); **ultimobranchial body** (Clark 1968; Grandi 1982b; Khairallah and Clark 1971; Sehe 1965); **thymus gland** (Bockman 1970, Raviola and Raviola 1967); **digestive tract** (Gábriel et al. 1990; Latimer 1920; Luppa 1977; Parsons and Cameron 1977; Rautenfeld et al. 1998; Thomas et al. 1994); **lingual and buccopharyngeal mucosa** (Beisser et al. 1998, Winokur 1988); **oral glands** (Kochva 1978; Meyer and Prutkin 1974); **liver** (Rutledge et al. 1981; Schaffner 1998; Tsuneki and Ichihara 1981; Tyler 1941); **pancreas** (Agulleiro et al. 1985; Miller and Lagios 1970); **reproductive system** (Simon 2000); **urogenital system** (DeBarras 1992; Fox 1977; Gabe et al. 1964; Meseguer et al. 1987); **penis** (Zug 1966); **urinary bladder** (Al-Awqati et al. 1977; Arruda 1983; Arruda and Dytko 1985; Arruda et al. 1984, 1990; Bank et al. 1982; Beauwens and Al-Awqati 1976; Brodsky et al. 1979; Buchinger et al. 1987; Cohen 1980; Cohen and Steinmetz 1980; Cohen et al. 1978; Cortas et al. 1983; Danon et al. 1976; Dixon and Al-Awqati 1979; Drenckhahn et al. 1987; Durham and Nagel 1986; Durham et al. 1987; Ehrenspeck et al. 1978; Fischer et al. 1983; Fritsche and Schwartz 1985; Fritsche et al. 1989, 1991a,b; Gapp and Carraway 1990; Gentile et al. 1970; Gluck et al. 1982; Graber et al. 1986, 1987, 1989a,b; Green et al. 1970; Henke et al. 1990; Husted 1979; Husted and Fischer 1987; Husted and Steinmetz 1981; Johnson et al. 1980; Kohn et al. 1990, 1993, 1997; LeFevre 1973a,b, 1974; LeFevre et al. 1971, 1973; Mueller and Steinmetz 1978; Palmisano et al. 1989; Park and Fanesti 1980; Potter and Arruda 1985; Rosen 1970, 1972a,b, 1973; Sabatini 1997; Sabatini and Kurtzman 1987a,b; Satake et al. 1983; Scheffey et al. 1991; Schilb 1977, 1978; Schwartz 1976; Schwartz and Flamenbaum 1976a,b; Schwartz and Tripolone 1983; Schwartz and Steinmetz 1977; Schwartz et al. 1974, 1982; Scott and Shamoo 1970; Shamoo 1971; Shamoo et al. 1970a,b; Steinmetz 1974; Stetson and

Steinmetz 1983, 1985; Stetson et al. 1985; Strum and Danon 1976; Wheeler and Arruda 1987; Wyssbrod 1969a,b; Yoder and Scott 1973; Youmans and Barry 2001); **colon** (Chang and Dawson 1988; Chang et al. 1991; Dawson 1977; Dawson et al. 1988; Halm and Dawson 1984a,b; Kirk and Dawson 1983; LeFevre and Reisman 1978; Liboff and Parkinson 1991; Post and Dawson 1992; Richards and Dawson 1986; Venglarik and Dawson 1986; Wilkinson and Dawson 1990); **cloacal bursae** (Peterson and Greenshields 2001; Smith and James 1958; Smith and Nickon 1961); **renal portal system** (Holz et al. 1997); **heart** (Almeida-Val et al. 1994; Arthur et al. 1997; Balaban 1978; Balaban and Ariel 1992; Ball and Hicks 1996; Brett 1965, 1971, 1973; Chiba and Yamauchi 1973; Davies 1962; Driedzic and Gesser 1994; Farmer and Hicks 2002; Farrell et al. 1994; Fawcett and Selby 1958; Galli et al. 2004; Gesser and Jorgensen 1982; Gesser and O'Poupa 1978, 1983; Gunther and Landis 1952; Hart 1968; Heinbecker 1930, 1931; Heinbecker and Bishop 1935; Hicks 1998, 2002; Hicks and Comeau 1994; Hicks and Farrell 2000; Hicks and Malvin 1992; Hicks and Wang 1996, 1998, 1999; Hicks et al. 1996; Holmes 1975; Holz and Holz 1995; Hurd 1931; Ishimatsu et al. 1996; Krosniuanas and Hicks 2003; Lobes and Penney 1973, 1974; Mecham 1983; Miller and Kasahara 1964; Mylebust et al. 1975; Phillips 2004; Poupa et al. 1977, 1978; Reeves 1963a,b, 1964; Reinhart and Zehr 1988, 1994; Robb 1953; Taylor et al. 1999; Wang and Hicks 1996; Wasser et al. 1990, 1997; White et al. 1989; Yamauchi and Chiba 1973; Yamaguchi et al. 1974, 1975); **blood vessels** (Albrecht 1967, 1976; Burda 1965; Kleiter and Lametschwandtner 1995a,b; Rodrigues 2003); **blood** (Barone and Jacques 1975; Belamerich et al. 1966; Brambel and Ehrlich 1941; Brown 1971; Brown et al. 1997; Charipper and Davis 1932; Clark 1968; Cohen 1954; Dessauer 1970; Dessauer et al. 1957; Dozy et al. 1964; Duguy 1970; Dunn and Perks 1970; Frair 1963, 1977, 1982; Frische and Bruno 2000; Frische et al. 2001; Garavini and Poli 1976; Gaumer and Goodnight 1957; Goin and Jackson 1965; Heady and Rogers 1963; Hirschfeld 1964; Hirschfeld and Gordon 1964, 1965; Horton et al. 1972; Hutton 1961; Hutton and Goodnight 1957; Jackson 1967; Jacques 1961, 1963; Jacques and Musacchia 1961; Jensen et al. 2001; Johlin and Moreland 1933; Kaplan and Rueff 1960; Kaplan and Timmons 1976; Klahr et al. 1969; Klicka and Mahmoud 1971; Kupchella and Jacques 1970; Langille and Crisp 1980; Maginniss et al. 1980; Maina and West 2005; Manwell and Schlesinger 1966; McCutchean 1947; Musacchia and Sievers 1962; Ramirez and Dessauer 1957; Reite 1973a,b; Riggs et al. 1964; Rutledge et al. 1981; Saunders and Patel 1998; Seal 1964; Seidel 2002b; Sheeler and Barber 1965; Simon and Robin 1970; Simoneit et al. 1970; Stenroos and Bowman 1968; Sullivan and Riggs 1967a-d; Tada et al. 2004; Thorson 1968; Tigyi et al. 1990; Ulsh et al. 2001; Wilson et al. 1960); **spleen** (Kroese and van Rooijen 1982, 1983; Tanaka 1998); **lymphatic system** (Berens et al. 1998; Bianchi et al. 1990, 1993; Bockman 1970; Lefevre et al. 1973; Ottaviani and Tazzi 1977; Rautenfeld et al. 1998; Satoh and Nitatori 1983); **trachea** (Pastor et al. 1987a); **lungs** (Bartels and Miragall 1983; Bartels and Welsch 1983, 1984; Gans and Clark 1978; Jackson 1971a,b; Levin 1989; Orgeig et al. 1997; Pastor et al. 1987b; Perry 1971, 1978, 1998; Perry et al. 1970; Powell and Hopkins 2004; Scheuermann et al. 1983; Spragg et al. 1979a,b, 1980; Welsch and Müller 1980); **muscles** (Callister et al. 1989; Crowe 1992; Ferrans et al. 1962; Franzini-Armstrong and Porter 1963; Furbringer 1874; Gadow 1882; Naeije and Crowe 1977a,b; Parrizas et al. 1995; Pfeiffer and Vogl 1992; Schumacher 1956; Skovgaard and Wang 2006; Wright and Hurn 1993); **body fat** (Ackman et al. 1971); **rostral pores and mental glands** (Winokur and Legler 1974, 1975); **spermatozoa** (Gribbins et al. 2003; Gist et al. 2000; Kaplan et al. 1966; Platz et al. 1980); **melanism and pigmentation** (Cahn 1937; Garstka et al. 1991; Griffin and Ernst 1974; Lardie 1983; Lovich et al. 1990b; Lowe et al. 2006; McCoy 1968; Tucker et al. 1995c); and **shell abnormalities** (Cagle 1947; Coker 1906; Forbes 1964; Hansen 1943; Newman 1906; Tucker 1997a; Zangerl 1969).

Development: **embryology** (Bowden et al. 2002; Burda 1965; Churchill and Storey 1992; Clark et al. 2001; Congdon et al. 1983; Dijkstra and Droese 1986; Etchberger et al. 1992, 1993; Ewert 1979, 1985; Filoramo and Janzen 2002; Gahr et al. 1992; Gilbert et al. 2001; Greenbaum 2002; Janzen et al. 2000a; Loredo et al. 2001; Mehta and Semagor 2006; Padgett 1987; Parsons 1959; Pearson 1985; Raghuramam 2004; Risley 1940; Sanstad et al. 2000; Spotila and Hall 1998; Suzuki 1963; Thomas et al. 1992; Tucker et al. 1997); **growth** (Andrews 1982; Ashton and Feldman 2003; Avalos 1975; Avery 1987; Avery et al. 1993; Brown et al. 1974; Burger et al. 1998; Cagle 1946, 1948a,b, 1950; Chou and Venugopo 1980 [1982]; Christy and Farlow 1973; Christy et al. 1974; Congdon et al. 1982, 1993; Denver and Licht 1988, 1991; Dodge and Wunder 1962, 1963; Dunham and Gibbons 1990; Emer 2004; Frazer et al. 1990a; Gibbons 1969, 1970a; Gibbons and Lovich 1990; Gibbons et al. 1981; Goebel 1998b; Lestrel et al. 1989; McCleod 1994; McRobert 1995; McRobert and Hopkins 1998; Mitchell and Pague 1990; Rice et al. 1972; Sarnat et al. 1979, 1981; Stamper et al. 1990; Stancel et al. 1998; Stone and Babb 2005; Thomas 1993; Tucker and Moll 1997; Tucker et al. 1995d, 1999; Webb 1961; Witzell 1999); **maximum size** (Platt and Rainwater 2003; Powell et al. 1982); and **longevity and aging** (Cagle 1950; Germano and Burg 1998; Gibbons 1976; Gibbons and Semlitsch 1981; Lutz et al. 2003; Patterson 1972; Snider and Bowler 1992).

Physiology: **circulation** (Altimiras Corderroure 1995; Bentley 1986; Bickler 1992a; Blumer et al. 1993; Burton 2002; Comeau and Hicks 1994; Crossley et al. 2000; Davies 1988, 1989, 1991, 1994; Dunn and Peters 1970; Faraci et al. 1982; Galli et al. 2006; Gardner and Baird 1961, 1962; Herman et al. 1997; Hicks 1998; Hicks et al. 1996; Holz et al. 1997; Hutton et al. 1960; Lovisolo and Re 1977; Lucey 1974;

Lucey and House 1977; McDonald 1976; McNeill et al. 1971; Millard and Moalli 1980; Millen et al. 1964; Overgaard et al. 2002; Risher and Claussen 1987; Seymour 1982; Simon and Robin 1970; Skovgaard et al. 2005a,b; Smits and Kozubowski 1985; Soderstrom et al. 1997; Stecyk et al. 2004; Stephens 1984; Stephens and Sanford 1989; Stephens et al. 1983; Tanaka 1981; Ware 1993; Wasser 1996; White 1976, 1978, 1984; Wood 1984); **respiration, gas exchange and diving** (Ackerman and White 1979; Baeyens et al. 1989a,b; Bagatto and Henry 1999; Belkin 1968a,b; Bermudez 1994; Burggren 1972, 1977, 1978, 1982; Burggren and Shelton 1979; Burggren et al. 1977, 1978; Caligiuri et al. 1981; Crawford and Gatz 1976; Crossley et al. 1998, 2000; Davies and Sexton 1987; Douglas et al. 1994; Fischer 1972; Frankel et al. 1966, 1969; Fraser et al. 2001; Glass and Wood 1983; Greenway and Storey 2000; Herman and Smatresk 1999; Hermes-Lima and Zenteno-Savin 2002; Hitzig 1982; Hitzig and Jackson 1978; Hitzig and Nattie 1982; Hitzig et al. 1983, 1985; Hopkins et al. 1996; Hutton et al. 1960; Jackson 1968, 1969a,b, 1971a,b, 1973, 1978, 1979; Jackson and Kagen 1976; Jackson and Schmidt-Nielsen 1966; Jackson and Silverblatt 1974; Jackson et al. 1974, 1976; Klicka and Mahmoud 1971; Lai and Miller 1973; Landberg et al. 2002; Lillywhite and Maderson 1982; Lucey 1975; Lucey and House 1977; Lutz and Kabler 1997; Lutz and Leone-Kabler 1995; Milsom et al. 1977; Neil 1970; Nilsson and Lutz 1992; Penney 1974; Pérez-Pinzón and Rice 1995; Robin et al. 1981; Sakurai et al. 1993; Sephton and Driedzic 1996; Seymour 1983; Shelton and Burggren 1976; Stabenau and Heming 1999; Stinner and Wardle 1988; Ultsch 1985; Ultsch et al. 1984; Vesely et al. 1991; Vitalis and Milsom 1986a,b; Wang et al. 1998; Ware 1993; Wasser 1996; Weinstein et al. 1986; White and Bickler 1987; White and Ross 1965, 1966; White et al. 1985, 1989; Wilkerson et al. 2003; Wilmore and Storey 1996, 1997a,b; Winter 1976; Wood and Lenfant 1976; Wu et al. 1988); **metabolism and energetics** (Altman and Robin 1969; Arthur et al. 1997; Baeyens 1987; Bailey and Driedzic 1996, 1997; Belkin 1968a,b; Bennett 1982; Bennett and Dawson 1976; Bickler 1992a; Bing et al. 1970; Brachfield et al. 1972; Brackee et al. 1992; Brooks and Storey 1988, 1990, 1993, 1994; Cai and Storey 1996; Chance 1957; Clark and Miller 1973; Dial 1987; Dodge and Folk 1963; Douglas 1995; Eliassen and Reite 1974; Fernandes 1996; Foley 1976; Gatten 1973, 1974a-c, 1975; Glidewell 1984; Guppy and Hochachka 1978; Haning and Thompson 1965; Hartmund and Gesser 1996; Kelly and Storey 1988; LeFevre et al. 1970; Lutz et al. 2003; McDougal et al. 1968; McFadden 1997; Miller 1961; Milton and Prentice 2006; Nilsson et al. 1991; Overgaard and Gesser 2004; Pakay et al. 2003; Penney and Kavanaugh 1975, 1976; Platzack and Hicks 2000, 2001; Reeves 1963a, 1966; Robin et al. 1964; Simon and Robin 1970; Simon et al. 1979; Song 1998; Stamper et al. 1990; Storey 1996, 2006; Storey and Hochachka 1974; Thompson 2001; Vree et al. 1988a,b, 1989a-c Willmore et al. 2001); **acid-base balance** (Bagatto and Henry 1999; Howell and Rahn 1976; Jackson 1969b, 1976; Jackson and Silverblatt 1974; Ultsch et al. 1984); **evaporative water loss** (Schmidt-Nielson and Bentley 1966); **renal function and osmoregulation** (Andersen et al. 1985; Baccari et al. 1993, 1996; Baze and Horne 1970; Bentley 1976; Bentley and Schmidt-Nielsen 1966, 1970; Bentley et al. 1965; Brodsky et al. 1978, 1980; Brown et al. 1983; Cowan 1973; Dantzler 1964, 1976; Dantzler and Schmidt-Nielsen 1966; Ditrich and Splechtna 1987; Dunckner and Fleischer 1983; Dunson 1967; Fanelli 1962; Foley and Spotila 1978; Friedlich et al. 1940; Gentile et al. 1970; Gill and Stephens 1983; Gluck et al. 1982; Hernandez and Coulson 1957; Laverty 1983; Laverty and Clark 1981; Leach 1964; LeFevre et al. 1971; Mahmoud and Klicka 1979; Mautz 1982; Minnich 1979, 1982; Nishimura 1985; Rosen 1972c; Schilb 1978; Stephens et al. 1983; Tarpey and Nicoll 1987; Tracy 1982; Vree and Vree 1984; Vree et al. !988b, 1989b,c; Yaoita et al. 1999); **digestion** (Anderson and Wilbur 1948; Berens et al. 1998; Bockman et al. 1989; Bouchard and Bjorndal 2005, 2006a,b; Hammond et al. 1988; Kochva 1978; Langslow et al. 1973; Parmenter 1981; Scheuermann et al. 1991; Secor and Diamond 1999; Skoczylas 1978; Thompson and Dawson 1978a,b; Timmermans et al. 1991); **brain and nerve** (Abe and Yamamoto 1988; Alaburda and Hounsgaard 2003; Alaburda et al. 2002; Albin and Gilmin 1992; Bakker and Crowe 1982; Balaban and Ulinski 1981a,b; Bangma and ten Donkelaar 1982, 1983; Bangma et. al. 1983; Bantli 1972; Bear and Ebner 1983; Belekhova 1979; Berkowitz 2001; Berkowitz and Stein 1994; Bickler 1992b; Bickler and Gallego 1993; Bidmon and Stumpf 1992, 1994; Bissoli and Contestabile 1988; Blanton and Kriegstein 1987, 1989, 1992; Blanton et al. 1985, 1987, 1989, 1990; Brand and Mugnaini 1980; Broniszewska-Ardelt and Miller 1974; Brüning et al. 1994; Butler and Bruce 1981; Chen 1993; Chih et al. 1989a,b; Connors and Kriegstein 1986; Connors and Ransom 1987; Contestabile 1976; Contestabile and Cuppini 1977; Contestabile and Dipardo 1976; Contestabile and Tabanelli 1977; Contestabile et al. 1978; Corderoy and Molnar 1999; Corwin et al. 1982; Cosans and Ulinski 1988, 1990; Crowe and Valk 1977; Crozier 1939; Csernansky 1991; Currie and Lee 1997; Currie and Gonsalves 1997; Curwen and Miller 1939; D'Aniello et al. 1999; Delgado-Lezama et al. 1997, 1999; Denk et al. 1994; Desan et al. 1984, 1989; Drakontides and Browner 1986; Dunser et al. 1981; Earhart and Stein 2000a,b; Ebner and Colonnier 1978; Edley et al. 1982; Edwards et al. 1989; Fan et al. 1997; Feng et al. 1988a,b, 1990; Fernandes 1996; Fernandez et al. 1996; Firth and Turner 1982; Foster and Hall 1975; Fowler et al. 1999; Fox and Steinberg 1988; Fulbrook 1982; Geri et al. 1982; Goldsmith et al. 1992; Gordon and Klintworth 1968; Gorman et al. 2005; Greer et al. 1981; Guertin and Hounsgaard 1998, 2006; Hall and Ebner 1969, 1970; Gabbiani et al. 1994; Hall et al. 1977; Halpern 1992; Hansen 1987; Hasan and Sasaki 1986; Haverkamp et al. 1997; Hertzler 1972; Hilbig et al. 1981; Höhmann et al. 1983; Hornsby 2000; Huwe 1999; Hylland

et al. 1994, 1996, 1997; Isayama and Eldred 1988; Jahr and Nicoll 1980; Johnson and Creighton 2005; Kalman et al. 1994; Keifer and Clark 2003; Keifer and Houk 1994; Keifer et al. 2003; Kiehn et al. 1992; Killackey et al. 1972; Kim et al. 1978; Kleiter and Lametschwandtner 1995b; Korte et al. 1980; Kriegstein 1987; Kriegstein and Connors 1986; Kriegstein and Shen 1987; Kriegstein et al. 1986; Krizaj et al. 1996; Künzle 1982, 1985a-c; Künzle and Wiklund 1982; Künzle and Woodson 1981, 1982; Kuzuma and ten Donkelaar 1979, 1980; Kuzuma et al. 1979; Larson-Prior et al. 1991; Lauritzen et al. 1988; Lennard et al 1989; Lu 1998; Lutz and Milton 2004; Lutz et al.1984, 1985; Marbey and Browner 1987; Marbey and Santos-Sacchi 1986; Mauer-Spurej and Mauer-Spurej 2005; Medina et al. 1991; Meissl and Ueck 1980; Mejia-Gervacio et al. 2004; Mermet et al. 2002; Milton and Lutz 1998, 2005; Milton et al. 2006, Morlock 1972; Mortin and Stein 1985, 2004; Mortin et al. 1984; Mufson et al. 1984; Mulligan and Ulinski 1990; Muñoz et al. 1998; Newman and Cruce 1982; Newman et al. 1983; Nilsson 2001; Nilsson and Lutz 1991; Nilsson et al. 1990, 1991; Okada et al. 1988; Ouimet et al. 1985; Pangma and ten Donkelaar 1983; Papez 1935; Patching 1974; Pek and Lutz 1997; Pek-Scott and Lutz 1998; Perez-Canellas et al. 1997; Perez-Pinzon et al. 1992a,b; Perrier and Hounsgaard 2003; Perrier et al. 2000, 2003; Peterson and Ulinski 1979, 1982; Powers and Reiner 1993; Prechtl et al. 1997, 2000; Prentice et al. 2003; Quay 1967; Rainey 1979; Rainey and Ulinski 1982, 1986; Reiner 1992; Reiner and Oliver 1987; Reiner et al. 1980, 1984; Rice 1986; Rice and Nicholson 1988; Richardson et al. 1997; Robbins 1972; Robin et al. 1979; Rodriguez et al. 2002; Ruigrok and Crowe 1984; Ruigrok et al. 1984, 1985a,b; Russo et al. 2000; Satoh and Nitatori 1983; Schaeffer et al. 1982; Schechter and Ulinski 1979; Scheuermann et al. 1984; Schlegel and Kriegstein 1987; Schwarzl and Schwarzl 1980; Senseman 1996, 1999; Senseman and Robbins 2002; Sereno 1985; Sereno and Ulinski 1985, 1987; Shen 1987; Shen et al. 1984, 1987; Shirley et al. 1987; Sick et al. 1985; Siegel and Privitera 1976; Siemen and Künzle 1994; Simon et al. 2003; Skoloda 1973; Smeets 1988; Smeets and Hoagland 1986; Smeets and Steinbusch 1990; Smeets et al. 1987,2003; Smith 1980; Smith and Perrier 2006; Smith et al. 1980; Starck 1979; Stein 1978, 1987, 2005; Stein and Daniels-McQueen 2002; Stein and Schild 1989; Svirskis and Hounsgaard 1997, 1998; ten Donkelaar 1976; ten Donkelaar and Bangma 1992; ten Donkelaar et al. 1980; Thompson 2001; Thurau et al. 1997; Troyer et al. 1992; Ulinski 1986a,b; Ulinski et al. 1992; Valk-Fai and Crowe 1979; Vigh et al. 1977, 1979; Wang et al. 2001; Waechtler 1980; Weiss and Ulinski 1985; Wilson and Kriegstein 1991; Woodson and Künzle 1982; Xia et al. 1992; Yamashita 1986; Yeow and Peterson 1986a-d, 1991; Young et al. 1993; Zhu and Keifer 2003; Zhu et al. 2005); **vision** (Ammermüller et al. 1990; Ariel 2006; Armington 1954; Arnold and Neumeyer 1987; Boycott and Guillery 1962; Cervetto and MacNichols 1972; Crozier et al. 1938; Cuenca et al. 1990; Dacheux 1982; Dvorak et al. 1980; Eldred et al. 1987; Fain et al. 1977; Fulbrook 1982; Gerschenfeld et al. 1980; Granda 1979; Granda and Sisson 1992; Granda and Stirling 1966; Granda et al. 1972; Hayes et al. 1968; Humphreys and Mallory 1977; Liebman and Granda 1971; Mancilla and Ulinski 2001; Martin et al. 1996; McFadden 1997; Mehaffey 1971; Mokin and Keifer 2006; Neumeyer and Jager 1985; Nguyen-Legros et al. 1985; Normann et al. 1988; Northmore and Granda 1991b; Repérant et al. 1992; Robbins 1970; Rosenberg 1993; Schmidt 1982; Sisson 1986; Skoloda 1973; Ventura et al. 2001; Weiler and Schütte 1985b; Wilke et al. 2001; Wilkison 1989; Zhang and Eldred 1992; Zwick and Holst 1976; Zwick and Granda 1968); **hearing** (Art and Fettiplace 1984; Art et al. 1982; Bonsacquet et al. 2006; Brauth and Reiner 1991; Browner et al. 1981; Crawford and Fettiplace 1978, 1979, 1980a,b; Farris et al. 2004; Gulick and Zwick 1966; Hackney et al. 1993; Jones et al. 1998, 1999; Khan et al. 1982; Künzle 1986; Lekovic 2001; Lenhardt 1981, 1982; Manley 2000; Moffat and Capranica 1977, 1978; Moravec and Peterson 2004; Paton et al. 1976; Patterson 1966; Ramprashad et al. 1986; Ricci and Fettiplace 1997; Ricci et al. 2000, 2002; Ridgway et al. 1969; Ruggero and Temchin 2002; Schnee and Ricci 2003; Silverman 2002; Wever 1978; Wever and Vernon 1956a,b; Wu et al. 1999); **taste** (Boycott and Guillery 1962; Korte 1980); **olfaction** (Berkowicz and Trombley 2000; Berkowicz et al. 1994; Boycott and Guillery 1962; Eng and Kocsis 1987a,b; Manton 1979; Mori and Shepherd 1979; Murphy et al. 2001; Nicoll and Jahr 1982; Pinato and Midtgaard 2003, 2005; Waldow et al. 1981); **endogenous rhythms** (Underwood 1992); **endocrinology** (Adriansen 1994; Agulleiro et al. 1985; Al-Awqati et al. 1976; Barsoum 1995; Beaumont 1994; Belanger et al. 1972; Belekhova and Gaidaenko 1985; Bentley 1962, 1971, 1976; Bergeron et al. 1998a,b; Bouizar et al. 1989; Bowden et al. 2002; Brewer and Enson 1980; Brown et al. 1974; Cardot et al. 1994; Cash 2000; Cash and Holberton 1999; Cash et al. 1997; Cipolle and Zehr 1984, 1985; Cipolle et al. 1986; Clark 1967, 1968; Clark and Khairallah 1969, 1972; Conlon and Hicks 1990; Conlon et al. 1990; Crain 1994; Crain et al. 1995, 1998; Crews 1984; Crews and Gans 1992; Crews et al. 1991; Crisp et al. 1998; Denver and Licht 1988, 1989a,b, 1991; Dimond et al. 1972; Dores and Harris 1993; Evans 1951, 1952a,b; Florindo 1980a,b; Gabe 1970; Gabe and Saint-Girons 1970; Gapp and Polak 1990; Glennemeier and Licht 1993a,b; Greenberg 1948; Hall and Chadwick 1984; Humphreys and Mallory 1977; Ku et al. 2001; Kaiya et al. 2004; Kim et al. 1984; Laverty 1977; Licht 1972, 1994a,b; Licht and Bradshaw 1969; Licht and Pavgi 1992; Licht and Porter 1985; Licht et al. 1989; Loffler et al. 2003; Lozano et al. 2000; Nicoll and Licht 1971; Noppadon 2005; Papkoff and Licht 1972; Pavgi and Licht 1982, 1988; Pearson and Licht 1982; Risley 1940; Rosen et al. 1980; Sandor and Lanthier 1964; Sanford and Stephens 1988, 1989; Sawyer et al. 1961; Selcer and Leavitt 1991; Selcer and Palmer 1995; Selcer et al. 2005; Simoneit et al. 1971; Smith 1995; Stephens and Caron 1988; Step-

hens and Hauben 1989; Tarpey and Nicoll 1987; Thornton 2001; Tsai and Licht 1993a-c; Tsai et al. 1994; Tsui and Licht 1977; Vivien-Roels 1969b; Whitworth et al. 2000; Willingham et al. 2000b; Zehr et al. 1981); **response to environmental stress** (Daly et al. 1965; Finkler 1999; Foley and Spotila 1978; Gaines et al. 2004); **thermal ecology and physiology** (Auth 1975; Bartholomew 1982; Belle et al. 2002; Boyer 1965; Brattstrom 1965; Bury et al. 2000; Cagle 1950; Churchill and Storey 1992; Churchill et al. 1997; Costanzo et al. 2001, 2006; Crawford et al. 1983; Crawshaw et al. 1980; Firth and Turner 1982; Foley and Spotila 1978; Gatten 1974c; Gist et al. 2000; Glidewell et al. 1981; Greenway and Storey 1999; Hammond et al. 1988; Hutchison 1979; Hutchison et al. 1966; Hutton et al. 1960; Janzen et al. 1992; Jarling et al. 1984, 1989; Jensen et al. 2001; Lacher et al. 1986; Lowe et al. 1971; Lucey 1974; Nutting and Graham 1993; Packard et al. 1997, 1999; Peters 1994; Risher and Claussen 1987; Spotila et al. 1984, 1990; Spray and May 1971, 1972; Standora 1982; Stinner and Wardle 1988; Sturbaum 1982; Warren et al. 2006; Weathers and White 1971; Weinstein et al. 1986; Willard et al. 2000; Yu et al. 1994); **muscle function** (Callister and Peterson 1988, 1992; Callister et al. 1986, 1992, 1995, 1996, 2003, 2005; Chung and Lennard 1989; Crowe 1992; Currie and Stein 1992; Gans and Dawson 1976; Hansen and Gesser 1980; Hermanson and Lennard 1984; Hermanson et al. 1986; Laidlaw et al. 1995; McDonagh et al. 2004; Mutungi and Johnson 1987; Myklebust et al. 1975; Naeije and Crowe 1977a,b; Naeije et al. 1976; Nielsen and Gesser 2001; Raviola and Raviola 1967; Van Nassauw et al. 1991); **reproduction** (Cox 1994); **biochemistry** (Abdelraheim et al. 2006; Acton et al. 1972; Adriaensen et al. 1991; Albin et al. 1991; Alexander 1970; Ambrosius 1976; Andersen et al. 1985; Baeyens et al. 1989; Bhargava and Barnard 1973; Blum et al. 1977; Bosma et al. 1999; Brambel and Ehrlich 1941; Brauth et al. 1983; Brooks and Storey 1989; Bucker 1961; Cain et al. 2003; Calzolai et al. 2005; Carmignani and Zaccone 1975; Carroll and Opdyke 1982; Chang and Dawson 1988; Chaponnier et al. 1995; Chen and Chavin 1970; Ciuraszkiewicz et al. 2006; Coulson and Hernandez 1971; Crawshaw and Holtz 1996; De Jong et al. 1981; Duncan and Storey 1992; Dunson and Heatwole 1986; Fukuyama and Epstein 1968; Edwards et al. 1990; Eldred et al. 1983; Fain and Rosen 1973; Garstka and Gross 1990; Hagey 1992; Harris et al. 1997; Haverkamp et al. 2000; Henen 1991; Herbert 1968; Herbert and Coulson 1975, 1976; Herbert et al. 1978; Hernandez and Coulson 1971; Hinton et al. 1992; Hochachka and Somero 1973; Holcomb and Jackson 1972; Holz et al. 1997; Howell et al. 1970; Howiel et al. 1993; Hunt and Licht 1998; Hutton 1960; James et al. 2003; Johnsen 1994; Johnsen and Rehfeld 1992; Jønson et al. 1999; Kaplan 1960; Kamata et al. 2005; Kaplan and Timmons 1976; Kaufman et al. 1990; Keiron et al. 2001; Kaack 1972; Koppengeffer 1986; Kornecki-Gerrity and Penney 1974a,b; Kupchella et al. 1977; Land and Hochachka 1993; Leslie and Clem 1972; Lobes and Penney 1973, 1974; Lushchak et al. 2001; Lutz and Manuel 1999; Malan and Reeves 1973; Malan et al. 1976; Masat and Dessauer 1968; Masini et al. 1996; McMohan and Lutz 1984; McMohan et al. 1985; Mehrani and Storey 1995a-c, 1996; Michioka et al. 1994; Milton et al. 2002; Mockel and Bernard 1969; Morikawa et al. 2005; Mutema and Rhoten 1994; Nattiee 1983; Ohya et al. 2006; Palmour and Sutton 1971; Papademas and Penney 1973, 1974; Penney and Kornecki 1972, 1973; Penney and Papademas 1975; Penney and Shemerdiak 1973; Platner 1950; Poglayen-Neuwall 1953; Reeves and Malan 1976; Reglodi et al. 2001; Reite 1972; Rice et al. 1995; Robin 1962; Rose et al. 1990; Schütte and Schlemermeyer 1993; Seal 1964; Seidel and Adkins 1989; Shamoo and Brodsky 1970; Simon et al. 1977; Simonic et al. 2000; Smeets and Steinbusch 1990; Smith 1929; SogArd Jensen 1981; Spotila and Hall 1998; Thomas et al. 1994; Ulsh et al. 2003; Vandercammen and Van Schaftingen 1993; Varriale and Bernardi 2006; Vigh and Vigh-Teichmann 1981; Vree and Vree 1983; Vree et al. 1987a,b, 1988a,b, 1989a-e, 1990, 1991a-c, 1994a,b; Walters et al. 1976; Weinstein et al. 1986; Whicker et al. 1992; White and Somero 1982; Will et al. 1981; Willmore and Storey 2005; Wu et al. 1989; Wyld and Brush 1979; Zweig and Crenshaw 1957).

Reproduction: **sexual maturity** (Cagle 1944c, 1948a, 1950; Christy et al. 1974; Gibbons and Greene 1990; Gibbons and Lovich 1990; Gibbons et al. 1981; Mitchell and Pague 1990; Stearns and Crandall 1984; Thornhill 1982; Tucker 2001b, 2002; Tucker et al. 1998d; Webb 1961); **sexual dichromatism** (Terrell and Garstka 1984; Viosca 1933); **sexual dimorphism** (Berry and Shine 1980; Cagle 1948a; Evans 1946, 1952a; Fitch 1981; King 1967; Lovich and Gibbons 1992; Valenzuela et al. 2004); **sexual cycles** (Bourne and Licht 1985; Brewer and Killebrew 1986; Burger 1937; Cagle 1944c; Callard 1980; Duvall et al. 1982; Garstka et al. 1991; Gibbons and Greene 1990; Gross 1986, 1996; Hubert 1985; Licht 1972; Lockwood et al. 1991; Lovich et al. 1990b; Moll 1979; Pfeiffer and Voge 1993; Rahil and Narbaitz 1973; Sprando and Russell 1988); **fecundity** (Fitch 1985; Iverson 1992b; Kuchling 1999; Marlen and Fischer 1999; Tucker 1999a, Tucker et al. 1998e); **courtship and mating** (Cagle 1950, 1955; Carpenter and Ferguson 1977; Carr 1952; Davis and Jackson 1970, 1971, 1973; Fritz 1991; Garstka et al. 1991; Gibbons and Greene 1990; Jackson and Davis 1972; Kalter 1999; Kim et al. 1978, 1981; Lardie 1980, 1983; Lehr 1989; Lovich et al. 1990a,b; Morbach 1996; Morris 1976; Nijs and Janssen 1993; Reinhold et al. 2002; Rives 1978; Seidel and Fritz 1997; Taylor 1933; Thomas 2002); **sperm storage** (Bedford 1979; Esponda and Bedford 1985; Gist and Congdon 1998; Gist and Jones 1987, 1989; Gist et al. 2001; Gross and Garstka 1984; Pearse and Avise 2001; Sever and Hamlett 2002); **sperm morphology and spermiogenesis** (Gist and Thurston 1988; Gribbins et al. 2003; Miranti et al. 1964; Sprando and Russell 1987, 1988); **oogenesis** (Callebaui et al. 1997); **eggs** (Aresco 2004; Bowden et al. 2001; Burger and Gibbons 1998; Cagle 1937, 1944c, 1950; Caudle 1984; Cong-

don and Gibbons 1983, 1985, 1987, 1990; Elgar and Heaphy 1989; Ewert 1979, 1985; Filoramo and Janzen 2002; Gibbons 1970a, 1982; Gibbons and Greene 1979, 1990; Gibbons et al. 1979a, 1982; Grant 1936; Iverson 1977; Iverson and Ewert 1991; Iverson et al. 1993; Jackson 1988a; Janzen et al. 1998, 2002; Kamprath 1988, 1989a,b; Lamb 1985; Lamb and Langdon 1985; Martinez-Silvestre et al. 2001; Mitchell and Pague 1991; Moll 1979; Palmer 1988; Pawlowski 2000; Solomon and Reid 1983; Tenney 1993; Thornhill 1982, Tucker 1995a,b, 1999a-c, 2000b, 2001b; Tucker and Janzen 1997, 1998; Tucker et al. 1998a,b, 2001; Wilbur and Morin 1988); **egg retention** (Cagle and Tihen 1948); **nesting** (Bertolero and Canicio 2000; Brimley 1909; Cagle 1937, 1944a, 1950; Congdon and Gibbons 1990; Drummond 1983; Gibbons and Greene 1990; Gibbons and Nelson 1978; Gibbons et al. 1982; Jackson 1988a; Martinez-Silvestre et al. 2001; Simak 1981; Taylor 1935; Tucker 1997b, 1999b, 2001a; Tucker and Filoramo 1996; Tucker and Warner 2000; Tucker et al. 1995b, 1997); **incubation** (Cagle 1950; Etchberger et al. 1991, 1992; Iverson 1977; Lageweg and Ijlst 1993; Lardie 1976; Tucker and Warner 1999; Turkowski 1972); **overwintering in nest** (Buhlman and Coffman 2001; Filoramo and Janzen 1999; Gibbons and Nelson 1978; Jackson 1994; Tucker and Packard 1998; Tucker and Paukstis 1999; Ultsch 1989; Willard et al. 2000); **hatchlings** (Congdon and Gibbons 1990; Ewert 1979, 1985; Kolbe and Janzen 2002; Lindeman 1993; Tucker 1999c, 2000a,c; Tucker et al. 1998c); **sex-determination** (Bull 1980, 1983; Bull and Vogt 1979, 1981; Bull et al. 1982; Burke 1993; Crews 2003; Crews and Gans 1992; Crews and Gergeron 1994; Crews et al. 1991, 1994, 1995, 1996a,b, 2001; Engel et al. 1981; Etchberger et al. 1991, 1992, 2002; Ewert and Nelson 1991; Ewert et al. 1994; Fleming and Crews 2001; Fleming et al. 1999; Gahr et al. 1992; Gale et al. 2002; Humphrey et al. 2005; Janzen et al. 1998; Janzen and Paukstis 1991; Janzen and Phillips 2006; Kettlewell et al. 2000; Lageweg and Ijlst 1993; Lance and Bogart 1994; Lockwood et al. 1991; Murdock and Wibbels 2003a,b, 2005; Nakamura et al. 1987; Palmer and Palmer 1995; Paukstis and Janzen 1990; Pietsch 1996; Rhen et al. 1999; Sarre et al. 2004; Schmahl et al. 2003; Takada and Koopman 2003; Takada et al. 2004; Thomas et al. 1992; Valenzuela et al. 2003; White and Thomas 1988, 1992a-c; Wibbels and Crews 1992, 1994, 1995; Wibbels et al. 1991a,b, 1993, 1994, 1998; Willingham and Crews 1999; Willingham et al. 2000a; Wilson 1994; Yao and Capel 2005; Yao et al. 2004); **sex reversal** (Arvy 1998; Crews et al. 1991; Sheehan et al. 1999; Willingham and Crews 1999); **twinning** (Szabuniewicz and McCrady 1967; Tucker 1996; Tucker and Janzen 1997); and **reproductive senescence** (Cagle 1944c).

Behavior: **activity cycles** (Anton 1987; Cagle 1944a; Cloudsley-Thompson 1982; Foster and Endler 1999; Ingold and Patterson 1988; Jarling et al. 1989; Lardie 1980; Smith and Iverson 2004); **basking** (Auth 1969; Boyer 1965; Cadi and Joly 2003; Cagle 1950; Dreslik and Kuhns 2000; Lindeman 1993, 1998, 1999; McDonald 1992); **movements** (Bennett et al. 1970; Cagle 1944b; Florence 1975; Gibbons 1970b, 1986; Gibbons et al. 1983, 1990; Gibbons and Semlitsch 1981; Morreale et al. 1984; Parker 1984, 1990; Schubauer et al. 1990; Thomas 1999; Thomas and Parker 2000; Thomas et al. 1999; Tucker 2000c; Webb 1961); **swimming** (Davenport et al. 1984; Juranek and Currie 2000; Pace et al. 2001; Wyneken 1988); **walking** (Blob et al. 1999; Field and Stein 1997; Gillis and Blob 2001; Stein and McCullough 1998; Wyneken 1988; Zug 1972); **orientation and navigation** (Hayes and Ireland 1972; Murphy 1970; Owens et al. 1986; Yeomans 1995); **direction reversal** (Seidman 1949); **color choice** (Ernst and Hamilton 1969; Humphreys and Mallory 1977); **feeding behavior and diet** (Auth 1975; Avery et al. 1993; Bjorndahl 1991; Bjorndal and Bolten 1993; Bouchard 2004; Bouchard and Bjorndal 2006a,b Cagle 1946; Christy et al. 1974; Clark and Gibbons 1969; Dreslik 1999; Ferguson 1962; Gutjahr 1995; Hart 1979, 1983; Hayes 1987; Helzig 1982; Herrel et al. 2002; Heyer and Muedeking 1976; Hilgenhof 1996; Humphreys and Mallory 1977; Jensen 1998; Kofron and Schreiber 1987; Lardie 1980; Mahmoud and Lavenda 1969; Mauermann 1995; McCauley and Bjorndahl 1999; Minyard 1947; Parker 1939; Parmenter 1980, 1981; Parmenter and Avery 1990; Schubauer and Parmenter 1981; Snow 1984; Spotila et al. 1989; Webb 1961; Yusa et al. 2006); **learning** (Burghardt 1977; Eskin and Bitterman 1961; Evans et al. 1974; Gast 2001; López et al. 2001; Morlock 1979; Murillo et al. 1961); **reinforcement** (Eskin and Bitterman 1961); **stereotypic behavior** (Carpenter and Ferguson 1977); **social behavior** (Burghardt 1998; Harless 1979; Thomas and Altig 2006); **aggression** (Bury 1972; Ernst 1964; Hayes 1987; Hilgenhof 1996; Lardie 1983; Lindeman 1999; Rossel 1997); **sleep** (Hayes 1993); **avoidance** (Granda et al. 1965); **visual alarm reaction** (Hayes and Saiff 1967; Ireland et al. 1969); **whistling** (Agassiz 1857; Cahn 1937); **defensive behavior** (Britson and Gutzke 1993; Cash et al. 1997; Greene 1988; Hayes 1989; Hayes and Saiff 1967); **righting reflex** (Ashe 1970; Ashe et al. 1975).

Ecology: **general** (Guyot Jackson 2003b; Witzell 1999); **diversification** (Stephens and Wiens 2003); **habitat** (Anderson et al. 2002; Bancroft et al. 1983; Bodie and Semlitsch 2000a; Buhlmann and Gibbons 2001; Burke 1995; Burke and Gibbons 1995; Cash and Holberton 2005; Conner et al. 2005; Gibbons 2003; Gibbons and Coker 1978; Gibbons and Harrison 1981; Gibbons et al. 1979b; Grosmaire 1977; Hart 1983; Jackson 2005; Kiviat 1978; Kofron and Schreiber 1987; Marchand 1942; Mauermann 1995; Means and Simberloff 1987; Morreale and Gibbons 1986; Rose and Manning 1996; Seymour 1982; Stone and Hranitz 1997; Tinkle 1959; Tuberville et al. 1996; Tucker et al. 1998a; White and Curtsinger 1986); **community structure** (Bilbrey 2005; Bodie et al. 2000; Dreslik et al. 2005, Franz et al. 1995, Leiden et al. 1999, Lindeman 2001, Mitchell and Pague 1991, Olalla-Tárraga et al. 2006; Platt 1973; Rizkalla and Swihart 2006; Russell et al. 2002; Smith et al. 2006; Stone et al. 2005); **populations** (Bancroft et al.

1983; Brown and Haver 1952; Burke et al. 1995; Bury 1979; Cagle 1942, 1950; Cagle and Chaney 1950; Chen and Lue 1998; Congdon and Gibbons 1989; Dreslik and Phillips 2005; Emer 2004; Frazer et al. 1990b; Gibbons 1969, 1970b,c, 1987, 1997; Gibbons and Semlitsch 1981, 1982; Gibbons et al. 1979b, 1990; Ingold and Patterson 1988; Ingold et al. 1986; Iverson 1982, 1984; Koons et al. 2006, Lindeman 1998; Parker 1990; Schubauer 1981; Schubauer et al. 1990; Stone et al. 1993, 2005; Willette et al. 2005; Witzell 1999); **sex ratio** (Aresco 2005a; Gibbons 1990c; Gibbs and Stern 2005); **biomass** (Congdon and Gibbons 1989; Congdon et al. 1986; Iverson 1982); **survivorship** (Aresco 2002; Aresco and Gunzburger 2004; Bodie and Semlitsch 2000b; Iverson 1991; Lutz et al. 2003; Parker 1996); **annual cycle** (Kofron and Schreiber 1987); **competition** (Arvy and Servan 1998; Cadi and Joly 2003; Elton 2000); **resource partitioning** (Lindeman 2000; Spotila et al. 1989); **hibernation and winter ecology** (Churchill and Storey 1992; Gregory 1982; Hutton and Goodnight 1957; Mantel 1997; Neill 1948; Nollert 1984; Ultsch 1989); **algal symbionts** (Dixon 1960; Ernst and Barbour 1972, Neill and Allen 1954, Proctor 1958); **predation** (Britson 1998; Buhlman and Coffman 2001; Burke et al. 1998; Cagle 1949, 1950; Elsey 2006; Erickson and Scudder 1947; Ferrell 2006; Goodpaster and Hoffmeister 1952; Hamilton and Freedman 2002; Iverson and Hudson 2005; Janes and Gutzke 2002; Janzen et al. 2000a,b; Jordan and Arrington 2001; Knight and Loriane 1986; Mather 1982; Minckley 1966; Semlitsch and Gibbons 1989; Stophlet 1947; Tucker et al. 1999; Turkowski 1972); **accidents** (Aresco 2005a; Barko et al. 2004; Brown and Sleeman 2002; Gibbs and Shriver 2002; Gibbs and Stern 2005; McCleod 1994; Rundquist 1985; Saba and Spotila 2003; Smith et al. 2006; Steen et al. 2006; Turkowski 1972); **biodiversity and conservation** (Aresco 2005b; Asmus 2003; Bowers et al. 2000; Bradley 1987; Buhlmann and Gibbons 1997; Burbrink et al. 1998; Burke et al. 2000; Burton 1972; Close and Seigel 1997; Foret 1998; Gibbs and Stern 2005; Kiviat and MacDonald 2004; Klemens 2000; Langford 2005; Moll 1977; Moll and Moll 2000; Pimentel et al. 2001; Platt et al. 1999; Sasa Marin 2000; Smith et al. 2006; Swihart et al. 2006; Thorbjarnarson et al. 2000; Warwick 1986; Warwick et al. 1990); **husbandry** (Aigner 1997; Anonymous 1995; Ballasina and Ballasina 1984; Berg 2000; Boycott and Robins 1961; Brames 2005; Bucke 1971; Chmelik and Korinek 1994; De Vosjoli 1992; Di Tizio 1988; Eggrenschwiler 1997; Engelmann 1984; Evans 1968; Flower 1929; Freire de Andrade 1994; Gandal 1958; Goebel 1998a; Gould et al. 1992; Gumpenberger and Henninger 2001; Hengstebeck 1995; Hersche 1998; Highfield 1996; Johnson 2004; Kimbrough 1993; Lehr 1987; Li and Tang 2001; Lutz 2000; McKibben et al. 1978; McRobert 1999; McWilliams 2005; Mosimann and Maran 2003; Müller 1970; Müller and Schmidt 1995; Nietzke 1973, 1998; Nijs 1995, 1996; Obst et al. 1984; Petzold 1975; Ravazzi 1996; Rimpp 1986; Rogner 1998; Rogner and Rogner 1988; Rudolph 1977, 1990; Schoemaker and Zandvliet 2005; Selbert 1995; Simpson 1995; Straub and Jurina 2001; Teare and Bush 1983; Thornton 1994; Warwick 1986; Wiedemer 1954; Xin-min 2005; Zajcek 2002); **parasites** (general lists are in Ernst and Barbour 1972 and Ernst and Ernst 1977, 1979. Other papers with data on parasites include Acholonu 1967; Aho et al. 1992; Barger 2004; Barger and Nickol 2004; Barger et al. 2004; Barnard and Durden 2000, Barrett and Butterworth 1973; Bennett and Tobie 1936; Bourque 1972, 1973; Bourque and Esch 1974; Brooks 1979, 1981; Byrd 1939, Cable and Fisher 1957; Cable and Hopp 1954; Cahn 1937; Carmichael 1984; De Voe et al. 2004; Dezfuli and Tinti 1998; Doyle 1989; Driml 1961; Ernst and Ernst 1980; Esch 1970; Esch et al. 1979a,b, 1990; Everhart 1958; Fairchild et al. 1966; Fisher 1960; Fowler 1946; Garcia-Varela et al. 2000; Gee 1988; Gournis 1993; Harwood 1931; Hedrick 1935; Hendricks et al. 1971; Hewitt 1940; Holliman and Fisher 1968; Hopp 1954; Hsu 1937; Innis and Kincaid 1999; Iverson and Perry 1994; Jacobson 1987; John and Smith 1997; Johnson 1969; Johnson et al. 1998; Jones et al. 1945a,b; Lamothe-Argumendo 1972; Leidy 1856, 1886; Limsuwan and Dunn 1978; Little and Hopkins 1968; MacCallum 1918a,b; MacDonald and Brooks 1987; MacDonald and Litchford 1974; Maloney and Chandler 1976; Martin 1973; McAllister and King 1980; McAllister and Upton 1988, 1989; McKnight 1959; Monks 2001; Olson et al. 2003; Pence and Casto 1975; Perkins 1928; Platt 1993; Price 1939; Radtke et al. 2002; Reagan et al. 1954; Rosen and Marquardt 1978, 1986; Rosengarten et al. 2001; Roudabush and Coatney 1937; Ryan and Lambert 2005; Sampson and Ernst 1969; Sanders and Cleveland 1930; Schilliger 2003; Schmidt et al. 1970; Schroeder and Ulmer 1959, Snyder 2004; Strohlein and Chritensen 1984; Stunkard 1917, 1921, 1923, 1926, 1927; Teow et al. 1992; Uglem and Beck 1972; Van Cleave 1913, 1921, [1919] 1922; Van Cleave and Bullock 1950; Wall 1941; Ward 1921; Watertor 1967; Whipple 1918); **diseases and disorders** (Allgoewer et al. 2002; Bata et al. 1989; Bodri et al. 1993; Brassert 1992; Ernst et al. 1999; Frye 1973; Frye and Carney 1972; Clark and Shepard 1963; Frye and Dutra 1976; Frye et al.1976, 1988; Garner et al. 1997; Gee 1941; Glosser et al. 1974; Hall 1980; Hoff and Trainer 1973; Ishii et al. 1976; Jackson 1970; Keymer 1978; Kitana 2005; Lovich et al. 1996; Martinez-Silvestre et al. 2001; Martinez-Silvestre and Frye 2002; Mausolf and Wunder 1974; Michael-Marler et al. 1983; Mitchell et al. 2005; Murphy and Collins 1980; Newman et al. 2003; Pasmans et al. 2002a,b, 2003; Pasquale et al. 1994; Schillinger 2003; Sieberling et al. 1974, 1975; Sinclair and El-Tobshy 1969; Sinn 2004; Stone and Manwell 1969; Tamm 1952; Wang and Qingiun 2005; Woo and Sottys 1969; Zwart and Buitelaar 1980; Zwart and Van der Gaag 1981); **immunology** (Kaufman et al. 1990; Turchin and Hsu 1996); **disease carriers** (Andrews et al. 1965; Andruetto et al. 1987; Arvy 1997b; Baker et al. 1972; Bone 1968; Bronikowski et al. 2001; Corsarini 1975; D'Aoust et al. 1990; Diaz 2005; Diaz et al. 2006; DuPonte et al. 1978; Fischetti and Ciuchini 1987; Fukase et al. 1994; Gangarosa 1985;

Geue and Löschner 2002; Hardy 1988; Herniou et al. 1998; Izadjoo et al. 1987; Jackson et al. 1969; Kasprzak et al. 1989; Kaufmann and Morrison 1966; Kaufmann et al. 1972; Kennedy 1969; Klenk and Komar 2003; Lamm et al. 1972; Mader and DeRemer 1993; McCoy and Seidler 1972, 1973; Michael-Marler et al. 1983; Mitchell and McAvoy 1990; Mixons 1965; Monzon Moreno et al. 1995; Nagano et al. 2006; Otis and Behler 1973; Pasmans et al. 2002; Richards et al. 2004; Rosenstein et al. 1965; Sá and Solari 2001; Shane et al. 1990; Sieberling et al. 1984; Strohl et al. 2004; Tauxe et al. 1985; Wells et al. 1974; Williams and Helsdon 1965; Zwart and Buitelaar 1980); **shell microorganisms** (Ernst and Barbour 1972; Tumlison and Clark 1997; Ziglar and Anderson 2005); **gravity response** (Daly et al. 1965; Wunder and Cook 1982; Wunder et al. 1974); **radiation and metal contamination** (Bickham et al. 1988; Brisbin et al. 1990; Burger and Gibbons 1998; Burger et al. 1998; Cosgrove 1971; Gibbons et al. 1990; Hays 2005; Hinton and Scott 1990; Hinton et al. 1992; Krebs 1960, 1961; Lamb et al. 1991; Lance et al. 1995; Meyers-Schöne et al. 1993; Mitchell 2004; Morreale et al. 1984; Peters 1986; Peters and Brisbin 1988, 1996; Scott et al. 1986; Tryfonas et al. 2006; Ulsh et al. 2000, 2001); **chemical contamination** (Bishop and Martinovic 2000; Edwards et al. 1990; Linder and Grillitsch 2000; Lyne et al. 1992; Meyers-Schöne et al. 1993; Moll 1980; Morikawa et al. 2005; Nagle et al. 2001; Palmer and Palmer 1995; Pearson et al. 1973; Schone 1989); **decomposition** (Abell et al. 1982); and **pesticide contamination** (Clark et al. 2000; Hall 1980; Holcomb and Parker 1979; Owen and Wells 1976; Rosato and Ferguson 1968; Rosene et al. 1961; Schone 1989; Sparling et al. 2006; Wells and Witherspoon 1975; Willingham 2001, 2004, 2005; Witherspoon and Wells 1975); **field and laboratory techniques** (Adams et al. 1975; Avery and Vitt 1984; Buhlmann and Tuberville 1998; Clark 1971; Crossley et al. 2000; Geoffrey 1998; Germano and Burg 1998; Gibbons 1990b; Glorioso and Niemiller 2006; Graham 1979; Greer et al. 2001; Hasan 1986; Heck 1991; Hinton and Scott 1990; Holz and Holz 1994; James et al. 2003; Kerr and Frankel 1972; Lindeman 1997; Lozano et al. 2000; Martorell 2004; Maxwell 1979; McDonald 1976; Meier 1998; Perry 1971; Oppenheim and Moon 1995; Plummer 1979; Pye and Carpenter 1998; Rosen 1974; Runyan and Meylan 2005; Samour et al. 1984; Slice 1993; Shugart and Theodorakis 1998; Smith 1974; Stephens and Creekmore 1983; Stillman and Scheuermann 1987; Thomas et al. 1997; Vos-Maas 1976; Wade-Jardetzky et al. 1980; Willingham and Crews 2000); **anthropology** (Severinghaus and Chi 1999); **economic use** (Borjas et al. 1993; Clark and Southall 1920; Lagler 1945; Roman and Bowen 2000); **pet trade** (Arvy 1997a; Cadi and Bertrand 2003; Ceballos and Fitzgerald 2004; Conner 1992; Drews 2001; Enge 2005; Evans 2002; Feehan 1986; Jenkins 1995; Pimentel et al. 2001; Schlaepfer et al. 2005; Spellerberg 1976; Telecky 2001; Warwick 1985, 1991; Warwick et al. 1990; Williams 1999); **common names and nomenclature** (Artner 1997; Banquer 1986; Burger 1952; Carr 1937, 1938; Chermock 1952; Collins 1997; Collins and Taggart 2002; Iverson 1985; Iverson et al. 2000; Jackson 1974; King and Burke 1989; Mertens et al. 1934); **bibliography** (Dixon 2000; Redmond et al. 1990).

• **ETYMOLOGY**. The specific name *scripta* is derived from the Latin scriptus, meaning written, presumably in reference to the letter-like markings on the carapace. The subspecific name *elegans*, also Latin, refers to the refined markings on the skin and shell. The subspecific name *troostii* is a patronym honoring Gerald Troost, a professor and naturalist from Nashville, Tennessee.

1. *Trachemys scripta scripta* (Schoepff)
Yellow-bellied Slider

Testudo scripta Schoepff 1792:16. See species synonymy.
Emys sanguinolenta Gray 1856:26. See species synonymy.
Trachemys scabra Agassiz 1857:434. See species synonymy.
Pseudemys scripta scripta: Carr 1937:76.
Pseudemys scripta: Stejneger and Barbour 1939: 166.
Chrysemys scripta scripta: Weaver and Rose 1967: 63.
Trachemys scripta scripta: Iverson 1985:4. First use of combination.

• **DEFINITION**. The supratemporal marking is a broad yellow postorbital blotch which may join a neck stripe. The bridge and plastron are often solid yellow with only a single ocellus or black oval smudge on each gular and inguinal scute. There is a wide vertical yellow bar on each pleural scute. Narrow vertical stripes appear on the posterior portion of the thighs, adjacent to the tail. Anterior width of the first vertebral scute is relatively narrow, less than 15% of carapace length. In old adults, the anterior edge of the nuchal bone is often deeply emarginate on each side of a narrow, projected cervical scute.

2. *Trachemys scripta elegans* (Wied-Neuwied)
Red-eared Slider

Emys elegans Wied-Neuwied 1839:213. See species synonymy.
Emys holbrookii Gray 1844:23. See species synonymy.
Trachemys lineata Gray 1873:147. See species synonymy.
Chrysemys scripta elegans: Boulenger 1889:78.
Chrysemys palustris elegans: Lindholm 1929:294.
Pseudemys troostii elegans: Stejneger and Barbour 1939:167.
Pseudemys scripta elegans: Cagle 1944a:105.
Pseudemys scripta bisornata: Preston 1966:222. Pleistocene fossil placed in synonymy by Jackson (1988b).
Chrysemys scripta petrolei: Weaver and Robertson

1967:58. Pleistocene fossil placed in synonymy by Jackson (1988b).
Trachemys scripta elegans: Iverson 1985:4. First use of combination.
Trachemys scripta bisornata: Jackson 1988b:318.
Pseudemis scripta: Franzini-Armstrong and Porter 1963:663. *Lapsus*.
Pseudymys scripta elegans: Simoneit, Belamarich, and Shepro 1971:63. *Lapsus*.
Pseudenays scripta elegans: Yamauchi and Chiba 1973:486. *Lapsus*.
Pseudomys scripta elegans: Brown, Guiliano, and Hough 1974:205. *Lapsus*.
Trachemys scripta petrolei: Seidel and Jackson 1990: 70.

• **DEFINITION**. A broad red supratemporal stripe occupies the postorbital area and often extends onto the neck. All of the plastral scutes typically have a dark ocellus or oval smudge and the bridge has dark elongated ovals or wavy markings. Each pleural scute has a narrow, often wavy, vertical bar bordered by black. Anterior width of the first vertebral scute is relatively broad, greater than 15% of carapace length.

3. Trachemys scripta troostii (Holbrook) Cumberland Slider

Emys troostii Holbrook 1836:55. See species synonymy.
Emys cumberlandensis Holbrook 1840:55. See species synonymy.
Pseudemys scripta troostii: Carr 1937:76.
Pseudemys troostii troostii: Stejneger and Barbour 1939:166.
Pseudemys scripta troosti: Schmidt 1953:103.
Chrysemys scripta troosti: Weaver and Rose 1967: 63.
Chrysemys scripta troostii: Ernst and Barbour 1972: 148.
Trachemys scripta troosti: Iverson 1985:4.
Trachemys scripta troostii: Ernst and Barbour 1989: 204. First use of combination.

• **DEFINITION**. This subspecies is only weakly differentiated from *T. s. elegans* by having a narrower spratemporal stripe which is orange or yellow, and broader yellow stripes on the legs and neck. Dark marking on the plastron and bridge are often faded or irregular in contrast to solid blotches.

• **COMMENT**. The taxonomy of *Trachemys scripta* has undergone extensive revision at the generic, specific, and subspecific levels. It was included in composite genera under *Pseudemys* (see Cope 1875; Carr 1952) and *Chrysemys* (see McDowell 1964; Weaver and Rose 1967) before Seidel and Smith (1986) separated *Trachemys* from those two genera, reverting back to the arrangement of Agassiz (1857). Boulenger (1889) included slider turtles from the West Indies in *Chrysemys* [= *Trachemys*] *scripta*. Throughout much of the last century, the species *scripta* included 12–22 subspecies which range from the eastern, central and southwestern United States, throughout Mesoamerica, and portions of South America (Ernst 1990, Legler 1990). Based on morphological evidence and corroborated by molecular data (Starkey 1997), Seidel (2002a) reported that the more northern subspecies (*T. s. scripta, T. s. elegans*, and *T. s. troostii*) comprise a divergent monophyletic lineage. They are retained in *T. scripta*, separate from all of the other recognized forms which have now been elevated or combined into different species (Seidel 2002a). There are very few, if any, examples of natural sympatry in the genus *Trachemys* (Seidel et al. 1999, Seidel 2002a). However, among the many examples of human introduction of a species or subspecies (especially *T. scripta*) into the range of another, hybridization is common (Aresco and Jackson 2006, Mitchell 1994, Seidel and Adkins 1987, Seidel et al. 1999, Tuberville et al. 2005). The extent to which this promotes extirpation or extinction by genetic "swamping" is an overlooked topic in turtle conservation which deserves attention.

• **ACKNOWLEDGMENTS**. We thank James N. Stuart for his extensive review, Loretta Seidel for typing portions of the manuscript, and Thomas K. Pauley and Dan Evans for providing funds for student assistance. Special thanks to Andy Price for his extensive work in editing this account.

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Primary editor for this account, Andrew H. Price.

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